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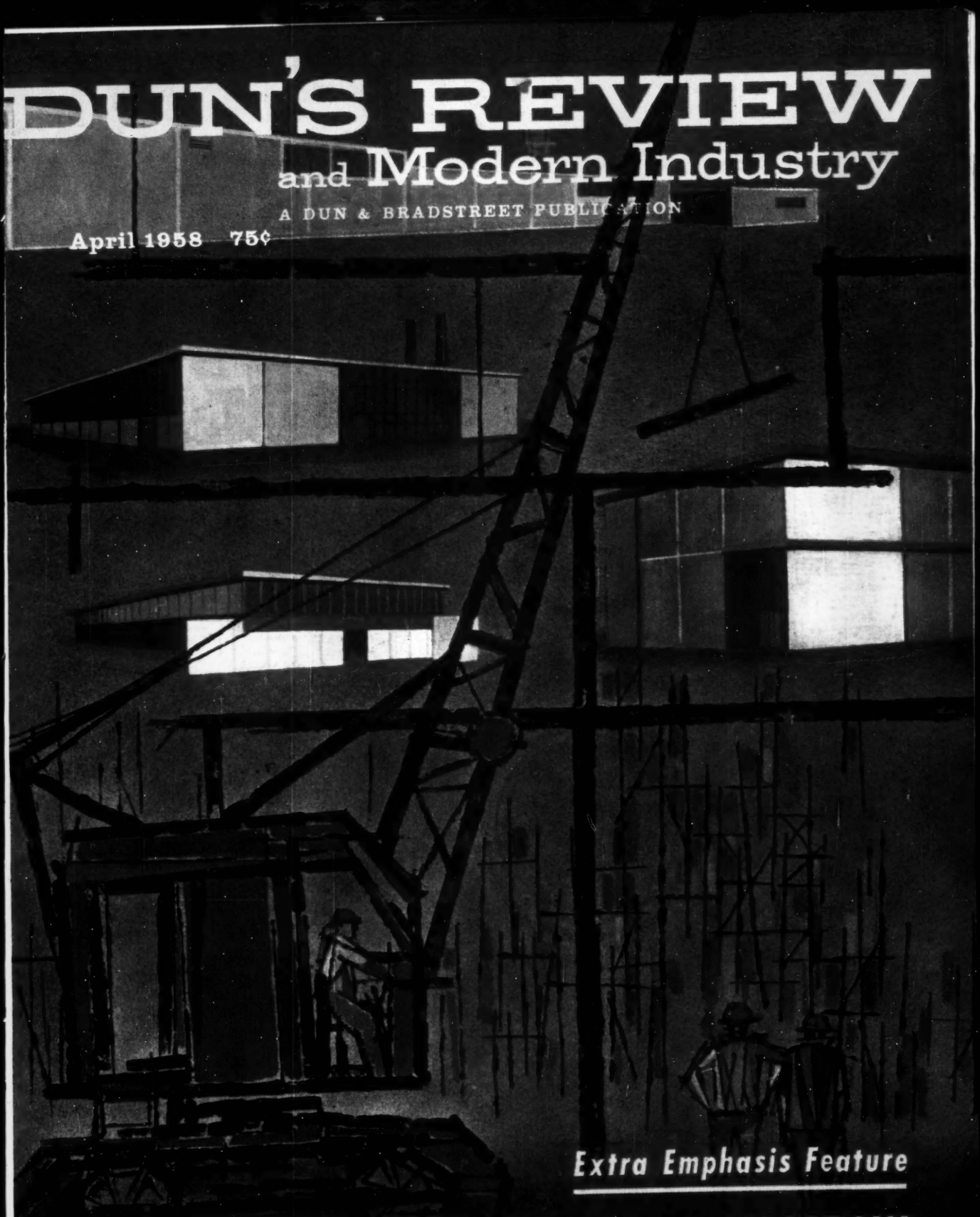

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Volume 71 No. 4

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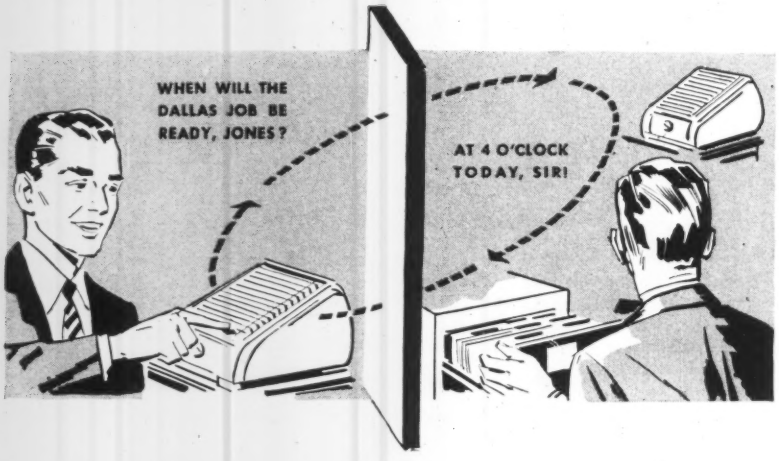

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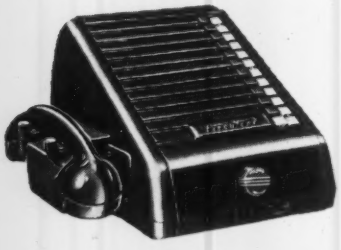

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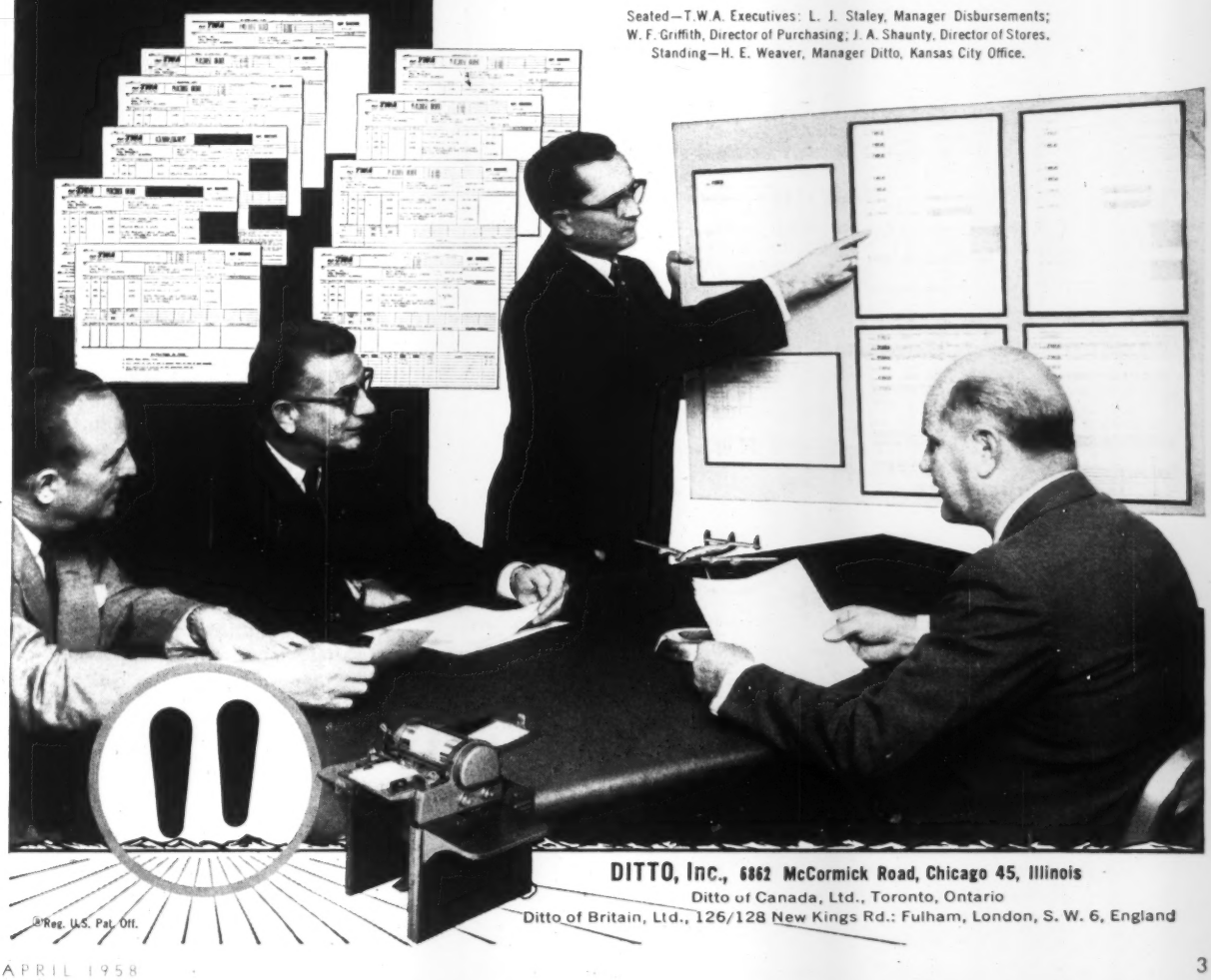

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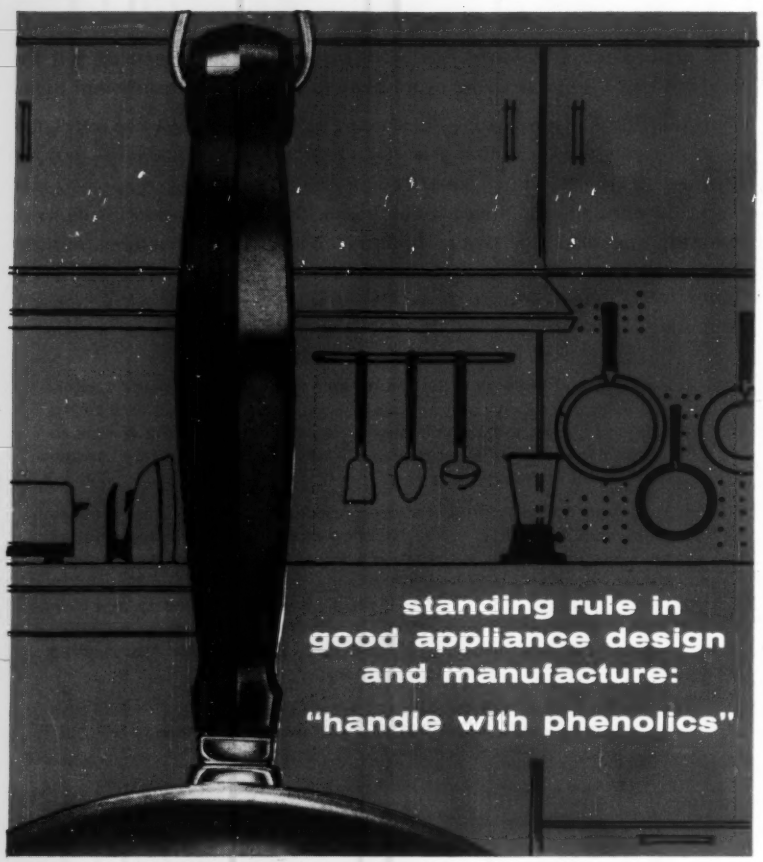

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• In this issue, DR&MI presents "The American Factory: Today and Tomorrow," a comprehensive appraisal of the whole problem of manufacturing facilities – their location, planning, design, construction, and operation. Edited by Carl Heyel, this major editorial feature is the distillation of many months of preparation, including round-table discussions and interviews with managers, owners, architects, builders, and other specialists in the field. In addition, DR&MI surveyed key companies on their plant management and expansion programs. Each area of questioning provided important details for the total picture of industrial construction, but the round table discussions were perhaps the most rewarding in terms not only of information developed, but of the interchange of ideas engendered in free discussion. Enough data were contributed in informal, "over-the-table" discussion to fill a 300-page book. Some of the most valuable comments –facts and ideas that would not normally come to the surface in a survey–were sparked in the crossfire of debate. One delighted contributor to the Chicago round-table on factories told us, "I don't care if you never publish a word. I'm ahead of the game right now."

The round-table technique encourages challenging questions and equally pointed answers. All our "extra emphasis" features have the generating impulse of these discussions. Looking forward to June, Tom Kenny and Carl Heyel have already held lively round-table meetings with shippers and carriers at New York and Chicago for our coming extra emphasis feature on transportation. Tom and Carl really deliver the goods–with time-saving and profit-building ideas in modern traffic management techniques, many of them evolved at round-table talks.

• The cost of being civilized is threatening to cause a tax crisis, and society and industry are taking a second look at the price tag attached to public education and the mainte-

nance of police, fire, health, and other departmental facilities in the typical community. Are industry and public utilities being asked to bear more than their share of the tax load? In this issue (page 33), Melvin Goldberg tells how the Pennsylvania Railroad won a partial victory over the New York City tax assessor, and how the Freeport Sulphur Company of Louisiana beat Governor Earl K. Long's tax impost on sulphur with the aid of aroused public opinion and the rugged support of its skilled and unskilled labor. Cases are cited in several other cities and states to show how, under the tax squeeze, oppressed industry may lay nothing but goose eggs for the public treasury.

● There was a time when industry did most of its testing at public expense, and perhaps in some instances it still does. A generation ago, brand names of new automobiles coming on the market annually were as numerous as the seasonal flurry of new book titles. The "shakedown" of the product was financed and supervised by the initial owners, who soon learned whether the engine was too sturdy for the chassis or vice versa. Industrial Editor Melvin Mandell, who has been flitting from New York to the Renault plant in Paris and to Northrup in California, reports (page 36) how modern technology has given product testing a precision touch and a conscientiousness about product claims that occasionally cramp the style of the salesmen and advertising copywriters. Yet in the long run product testing can be a powerful incentive to sales, especially for a new product trying to elbow its way past competitors. The incidents cited by Mandell ought to be preferred reading for companies whose standards have slipped.

● A high-ranking Japanese general was asked what American weapon had contributed most heavily to Nippon's defeat. He replied unhesitatingly, "The American bulldozer." One might ask now what American export item is contributing most effectively to the profits of U. S. manufacturers. There is evidence that the answer would be heavy machinery—including earth-moving equipment. As domestic sales fall off, A. O. Stanley points to machinery exports as a profit producer for American companies. —A. M. S.

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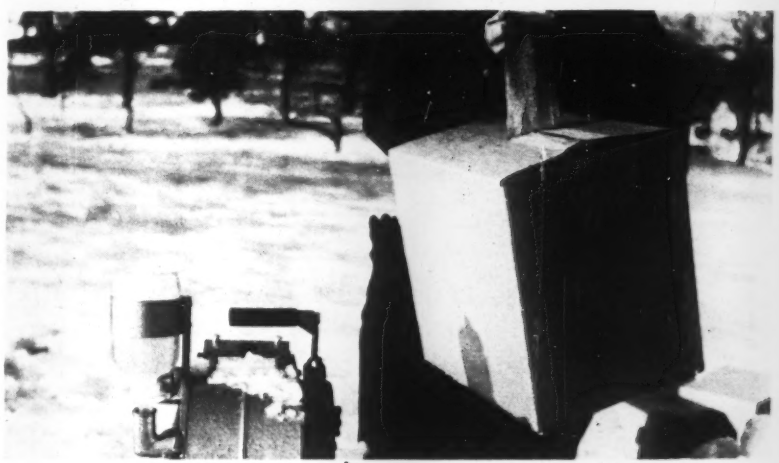

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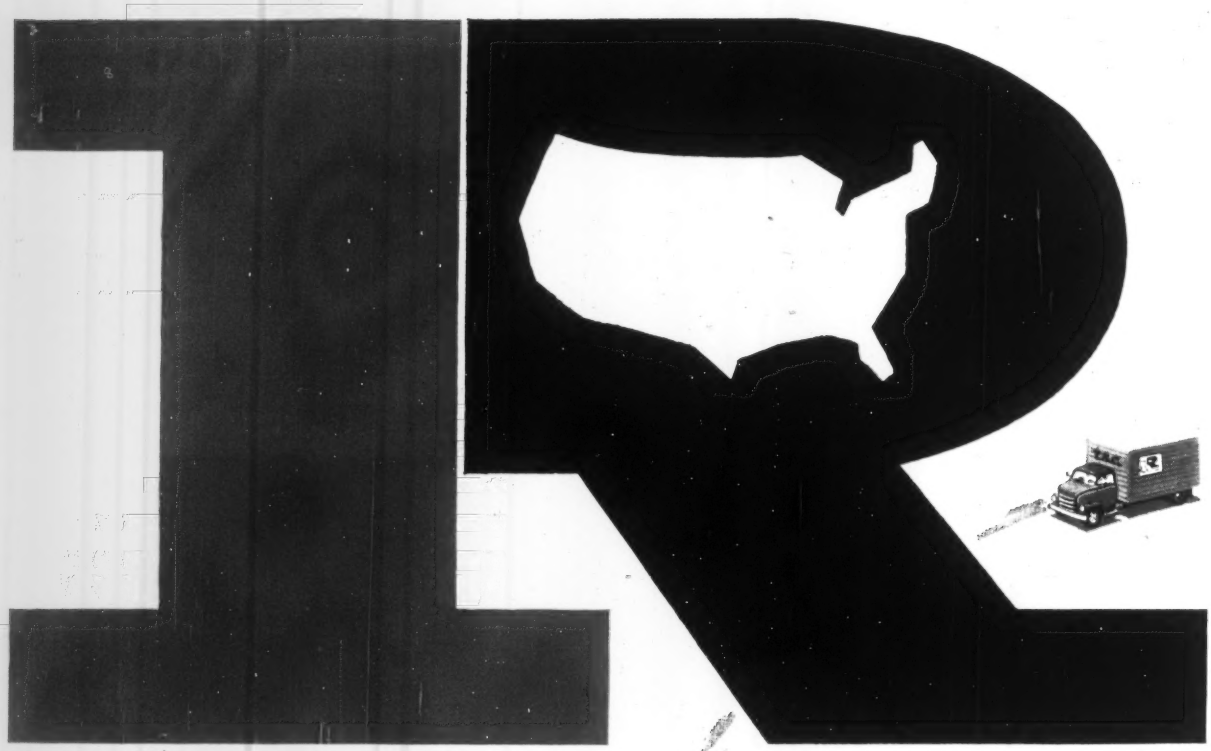

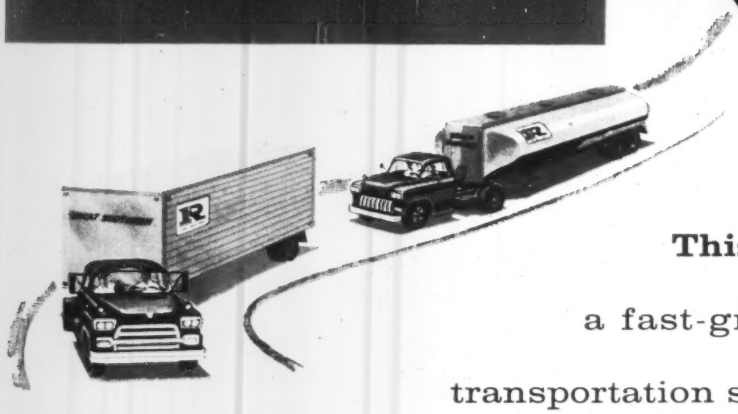

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THE TREND OF BUSINESS

LAST MONTH brought more depressing reports from the business front—another drop in industrial production, a further rise in the seasonally adjusted rate of unemployment, a disappointing Easter season for department and apparel stores, and no sign of a major recovery in auto sales. All told, the record provided further evidence that the downturn, which began last Summer, is more than a "breather."

So far as can be seen in late March, however, the worst of the decline in over-all activity is over or will be shortly. Dollar demand may have hit bottom last quarter and real output should turn up between now and July.

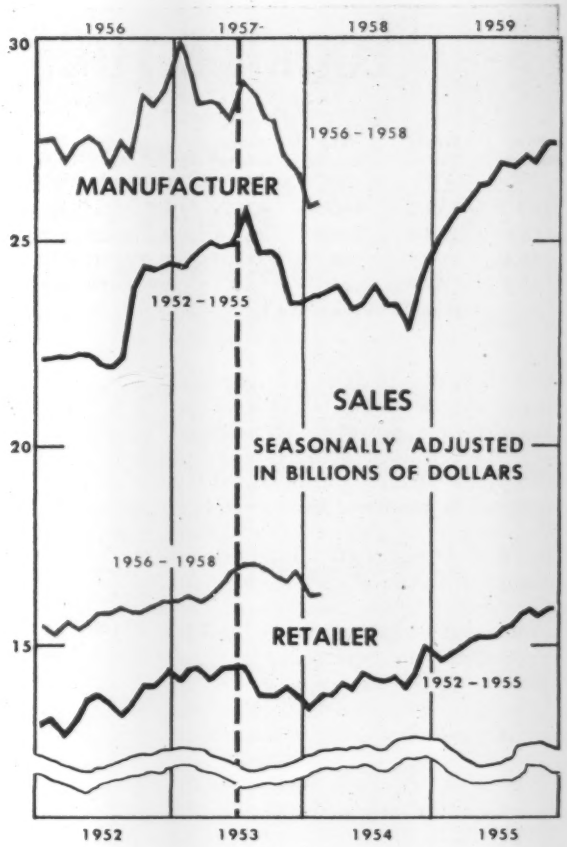
A sharp tax cut superimposed on increased Government spending—whatever the long-run effects—would insure a more vigorous rebound. At the moment of writing, the pertinent particulars of a possible tax cut—the when, where, and how much—are still fluid.

In fact, assuming stable tax rates, dollar spending can hardly return to the Summer 1957 level before next Autumn, and physical production and unemployment are unlikely to do so even by next Winter. Over the four quarters starting April 1, output of goods and services (gross national product) should total about $439 billion. While slightly above the 1957 figure in current dollars, this will be less than last year's total in constant dollars, since prices will average over 2 per cent higher. The Federal Reserve index of industrial production will average perhaps 134, definitely short of its 1957 level of 144. Unemployment will run somewhat above the 1957 total, reflecting not only lower employment but growth in the civilian labor force. Corporate profits will also be below last year's total.

Prospects for consumer spending seem fairly clear. Outlays will hold their own pretty well, but there is nothing in the cards to suggest a forward surge, which would itself initiate a pickup in over-all activity. Excluding autos, retail sales were good in January, did not fare badly in February after allowance for unfavorable weather, and apparently got off to a fairly good start in March. Spot reports indicate that sales of furniture, major appliances, and small electrical housewares improved appreciably in early March and were close to those of a year earlier. This trend, however, is less a reflection of strong consumer confidence than of efforts to meet the basic needs, despite higher prices, of a growing population. (The marked shift in outlays from autos to food, clothing, and essential services indicates this.)

Buying may move upward at a moderate rate over the next four quarters. For one reason, earned income will gradually rise as output expands.

The long-term uptrend in OASI benefits will continue, and the jobless will receive partial income support from unemployment compensation and public assistance payments—though on a diminishing scale if insured unemployment declines.



Manufacturers' sales have drifted lower for about a year. The dotted line at July 1957 and July 1953 indicates the months that are now generally accepted as the beginnings of the two most recent economic contractions. (Seasonally adjusted data from U.S. Department of Commerce; February estimate by DR&MI).

Moreover, with prices promising to remain high and population increasing, a further modest reduction in the consumer savings ratio is to be expected. Substantial growth in spending, however, would be improbable without the stimulus of an income tax cut or a strong recovery occuring elsewhere in the system to restore consumer confidence and encourage heavier purchases of durables. Selective excise tax reductions could help too.

Private investment

Private investment will run well below last year's level. Of its four major components—private nonfarm housing, other private domestic fixed investment, net foreign investment, and inventory investment—all but the first will be down.

There will be a decrease in spending for inventory. In 1957, stocks rose about $1 billion. The odds are

LOOKING FOUR QUARTERS AHEAD . . .

First Quarter 1957	Second Quarter 1957	Third Quarter 1957	Fourth Quarter 1957	*Figures in billions of dollars at seasonally adjusted annual rates**	First Quarter 1958	Second Quarter 1958	Third Quarter 1958	Fourth Quarter 1958	First Quarter 1959
429.9	435.5	440.0	432.6	GROSS NATIONAL PRODUCT	425.1	428.6	434.7	441.6	449.8
276.7	278.9	283.6	282.4	CONSUMER SPENDING	55.4	55.0	56.4	57.7	59.7
85.6	86.9	86.7	87.0	GOVERNMENT OUTLAYS	88.4	90.0	91.9	94.0	95.5
67.7	69.7	69.7	63.3	PRIVATE INVESTMENT	281.3	283.6	286.4	289.9	294.6

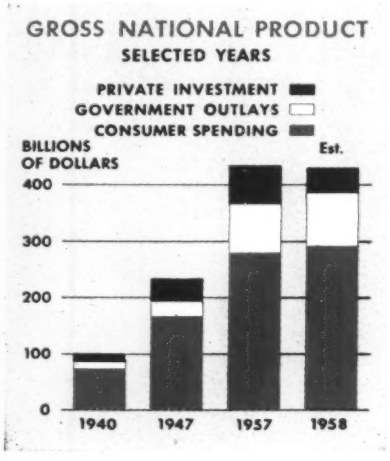
* Detail will not necessarily add to totals due to rounding. 1957 figures are from the National Income Division, U.S. Department of Commerce; 1958 and 1959 estimates are by the authors.

that they will be reduced appreciably during the next twelve months. Paradoxically, however, the behavior of inventory investment over most of this period should tend to hasten the uptrend in business. More than half the decline in gross national product to date has been caused by the abrupt inventory change in the nonfarm sector, which took place in recent months. Last Summer, sellers were adding to their stocks at a rate of over $2 billion per year. In the Autumn, however, they cut their holdings at a rate of over $3 billion. As of mid-March, they appear to have done so even more rapidly (perhaps at a rate exceeding $6 billion annually) in the Winter months. (Farm stocks, on the other hand, advanced throughout 1957 and probably did not decline much, if at all, last quarter.) It is almost certain, however, that the maximum rate of reduction has already been seen.

Further liquidation will take place largely in manufacturing durables, where most of the recent cuts have been made, and among car dealers. Wholesalers do not need to pare much to bring inventory into line with expected sales volume. And with few major exceptions—most notably, autos—stocks at the retail level are low relative to prospective sales rates and may well be increased in the near future (DR&MI, February 1958, page 19). This prospect is among the reasons for expecting a substantial moderation in the over-all drop in stocks by next Summer at the latest.

Housing to rise

Private nonfarm residential construction will be on the upgrade. Housing had a mediocre first quarter, partly because of bad weather in February. Starts, however, were



fairly high last January, and there is good reason to think that they came back in March and will do well over the next few months. (On a seasonally adjusted basis, applications for Federal Housing Administration insurance commitments and Veterans' Administration appraisals, both of which lead starts by several months, advanced sharply in January.) As a result, value put in place should increase this Spring.

The outlook for later months is still more encouraging. Even before Washington undertook to spur house building as an anti-recession move, some improvement had been in prospect. Mortgage money promised to be more plentiful than in 1957. Furthermore, changes in FHA standards —reduction in minimum down payments, extension of maximum payoff period, and relaxation of technical insurance rules—were certain to permit lenders to finance, and home buyers to acquire, a somewhat larger number of units. (Available evidence suggests that basic demand for dwelling space is still strong. Last Autumn, for example, the vacancy ratio stood at only 2.5 per cent, or below its level at the close of 1955, despite the completion of over 2.25 million units in 1956 and 1957.)

Greater gains are now likely to result from other recent or impending measures—notably a further reduction in minimum down payments on FHA-insured units; a 50 per cent rise in maximum housing value eligible for FHA insurance; a step-up in direct Government lending for veterans' housing in rural areas; and a substantial increase in sums available to the Federal National Mortgage Association for financing GI housing and bolstering the general housing mortgage market.

All told, it is now reasonable to expect private nonfarm starts to total 1.1 million to 1.125 million over the next four quarters, against slightly less than 1 million in 1957. Since starts will be trending upward during this period and since the average value of houses will probably be lower, value put in place will not rise in proportion. But it should easily average well over $1 billion more than in 1957. Allowance for an increase in outlays for additions, alterations, and so-called nonhousekeeping purposes would place the over-all gain in the neighborhood of $1.5 billion.

A sizable dip will occur in private domestic fixed investment other than nonfarm housing. After holding close to its all-time peak last Fall, outlays in this area fell off substantially in early 1958 and are apparently headed for their first major postwar decline. By historical standards, however, the drop from 1957 levels will not be especially severe—about one-eighth, as against more than one-fifth in 1929–1930 and 1937–1938.

As in earlier postwar adjustments, the slide-off will be greatest in nonfarm durable equipment, industrial

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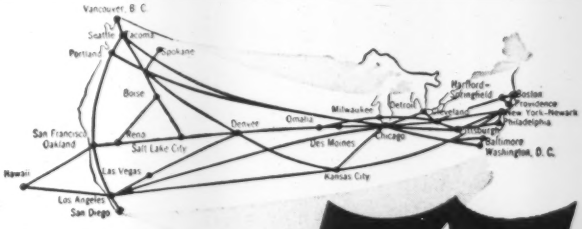

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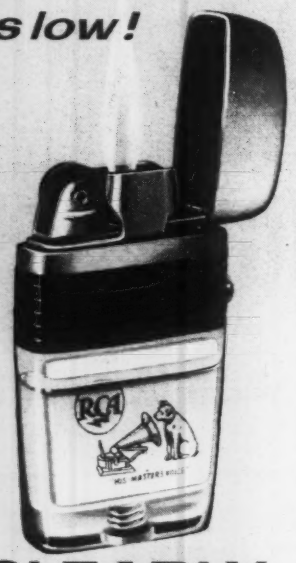

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plant, and some classes of commercial buildings. In fact, all other private nonresidential construction, including utilities, should not average much below 1957. Contracts for these structures, excluding oil and gas wells, were let at a record-breaking rate last year. Moreover, most of the gains occurred in categories with long building cycles (hospitals, churches, office buildings, and utilities). As a result, value put in place of this group seems certain to remain for several months close to its high Autumn rate.

While a recent weakness in new awards in some fields, coupled with deferment of some pipeline projects because of the Memphis Gas decision and planned cutbacks in oil-well and gas-well drilling, foreshadows a greater decline later, the over-all reduction still promises to be moderate. (By early 1959, outlays for "lease-purchase" post offices should be a plus factor.)

As noted, outlays for producers' durables are in for a bigger reduction, but a real collapse is not in prospect. Admittedly, new orders for machinery have been falling off since last Spring and were still running below sales—which themselves were declining—in the latest month for which full data are available (January). There is reason to think that the bottom in order placement may not be far away. (Machine-tool orders took a big jump in February, and producers of nonelectrical machinery ex-

BUSINESS SIGNPOSTS

1939 Average	1947 Average	Selected WEEKLY Indicators†	Latest Week	Previous Week	Year Ago
102	163	**STEEL INGOT PRODUCTION** Ten Thousand Tons (a)	136	142	236
25	49	**ELECTRIC POWER OUTPUT** Ten Million KW Hours (b)	118	119	117
76	121	**BITUMINOUS COAL MINED** Hundred Thousand Tons (c)	74	76	103
69	92	**AUTOMOBILE PRODUCTION** Thousand Cars and Trucks (d)	102.3	105.8	161.8
35	98	**DEPARTMENT STORE SALES** Index 1947–1949 = 100 (e)	109	106	113
5	13	**BANK CLEARINGS, 26 Cities** Billion Dollars (f)	22.4	26.0	22.7
284	67	**BUSINESS FAILURES** Number of Failures (f)	357	336	318

1939 Average	1947 Average	Selected MONTHLY Indicators‡	Latest Month	Previous Month	Year Ago
58	100	**INDUSTRIAL PRODUCTION** Index 1947–1949 = 100 (e)	130	133	146
58	95	**NONFARM COMMODITY PRICES** Index 1947–1949 = 100 (g)	125.8	126.2	125.5
37	100	**FARM COMMODITY PRICES** Index 1947–1949 = 100 (g)	95.5	93.6	88.8
59.4	95.5	**CONSUMERS' PRICE INDEX** Index 1947–1949 = 100 (g)	122.5	122.3	118.7
3.5	10.0	**RETAIL SALES** Billions of Dollars (h)	16.2	16.7	16.4
5.4	15.6	**MANUFACTURERS' SALES** Billions of Dollars (h)	26.3	26.7	30.0
45.8	58.0	**EMPLOYMENT** Millions of Persons (h)	62.0	62.2	63.2
72.9	190.5	**PERSONAL INCOME** Billions of Dollars, seasonally adjusted annual rate (h)	341.8	343.6	338.5
103	257	**BUILDING PERMIT VALUES** Millions of Dollars (f)	435.7	438.3	433.8

SOURCES: (a) Amer. Iron & Steel Inst.; (b) Edison Elect. Inst.; (c) U.S. Bureau of Mines; (d) *Automotive News*; (e) Federal Reserve Board; (f) DUN & BRADSTREET, INC.; (g) U.S. Bureau of Labor Statistics; (h) U.S. Department of Commerce. †WEEKLY INDICATORS: Steel and bank clearings data for the fourth week of March; all others for the third week. ‡MONTHLY INDICATORS: Manufacturers' sales for January; all others for February.

I foresee a safe journey

...thanks to

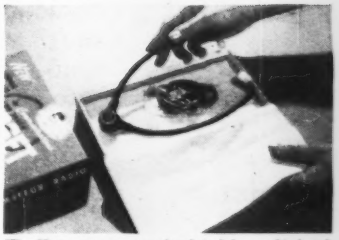
TUFFLEX packaging

The package in the picture could be any size or shape, contain any kind of product. The big news is hidden inside. It's a new protective packaging material that reduces shipping damage, cuts packaging costs, for scores of shippers.

The name is Tufflex—in two basic product types—a felted cellulose fiber cushion padding and a non-woven conforming fabric.

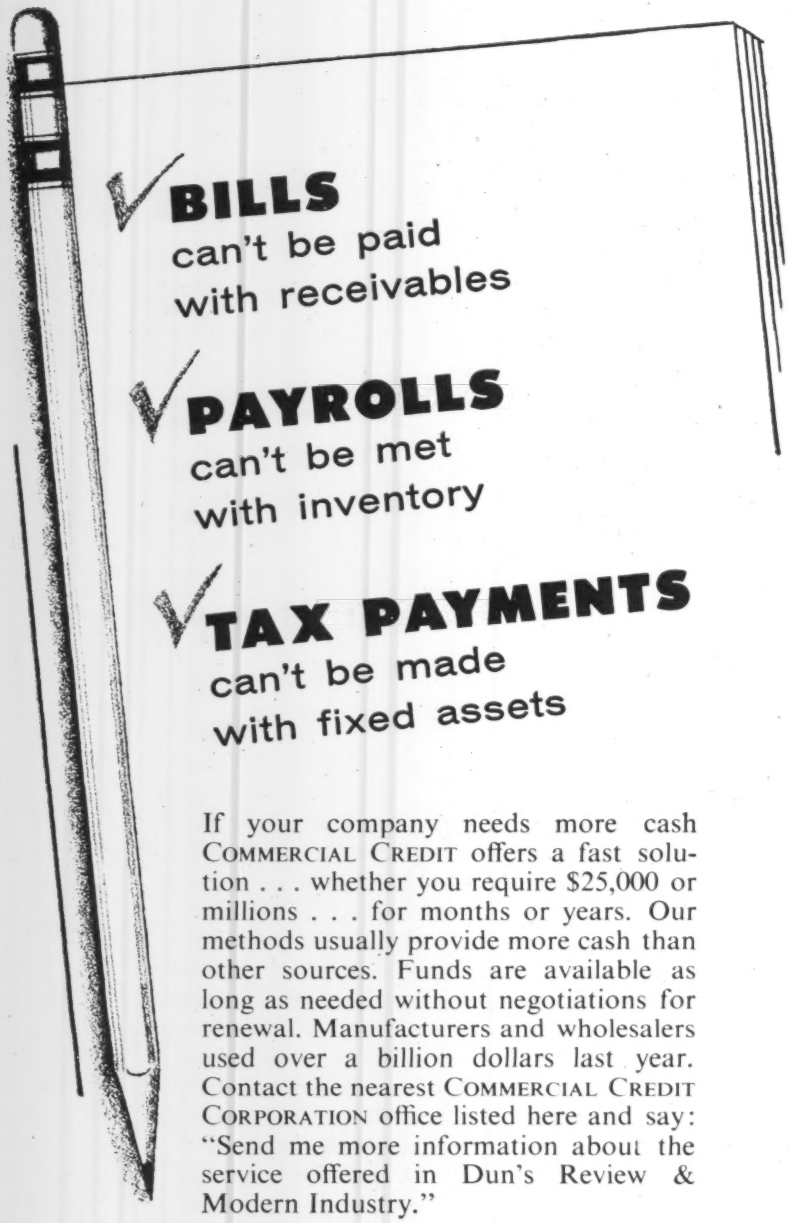
The important fact about Tufflex is its tremendous versatility. Soft, impact-resisting Tufflex is ideal for flotation, surface protection, pressure-point padding. It can be moisture resistant or moisture absorbent, as you want it. It's excellent for thermal-packaging—protects against heat or cold. A complete range of types and thicknesses gives you the exact protection you need.

Get the facts about Tufflex...find out how shippers are saving money, cutting costs with this new protection. Wood Conversion Co., Dept. 239-48, First Natl. Bank Bldg., St. Paul 1, Minn.



Tufflex protects the highly polished surface of this delicate radio headset. Today, Tufflex products are used for packaging everything from canoes to lettuce.

FOR CUSHIONING • PROTECTIVE PADDING **TUFFLEX** INSULATION • SOUND DEADENING • MOISTURE ABSORBENCY OR REPELLENCY



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COMMERCIAL CREDIT COMPANY subsidiaries, during each of the last several years, advanced over one billion dollars to manufacturers and wholesalers to supplement cash working capital. The total volume of finance subsidiaries amounted to over three billion dollars.

pect their order volume to rise significantly in the last three quarters of 1958, according to a recent McGraw-Hill survey.) Since the year-end backlogs still represented the equivalent of more than four months' shipments, a steep further decline in deliveries appears improbable.

New orders for producers' transport equipment still appear to be running well below sales, foretelling a continued decline in sales. Even so, unfilled orders seem large enough to preclude a sharp downtrend in deliveries, except in the case of freight cars. For producers' durables as a whole, spending over the next four quarters should average about one-sixth below the 1957 rate. If it does, it will still exceed the total spent as recently as 1955.

This view of the trend is strongly supported by the recently released Securities & Exchange Commission and Department of Commerce survey of planned equipment and construction outlays other than those charged to current account and those made by farmers and private nonprofit organizations. This survey, which proved very accurate, over-all, in both 1949 and 1954, indicates that spending in these areas in calendar 1958 will run around 13 per cent below the 1957 total. Since, however, outlays in the excepted areas, which represented about one-quarter of the grand total last year, should not decline much, the over-all drop will be somewhat smaller—about 10 or 11 per cent. The spread between 1957 and the four quarters covered in our projection of the gross national product (see table) is unlikely to be more than a couple of points larger.

Foreign investment

Net foreign investment will also be lower. Our favorable balance, after rising above $4 billion (seasonally adjusted annual rate) last Winter, fell off steadily in later months of 1957 to a rate of $2 billion in the closing quarter of 1957. This reflects a persistent growth in merchandise imports despite a slide-off in our export volume. On a seasonally adjusted basis, the downtrend is likely to continue this year, though at a much slower rate. Two reasons for a further decline in sales abroad are: (1) lessened basic demand for our products because of the slowdown in world economic growth and (2) im-

porters' need to conserve gold and dollar reserves, which were sharply reduced in 1956 and early 1957 partly because of the Suez crisis. Imports are likely to fall too, but not so much as exports.

Government spending—major prop

Over the next four quarters, a major, continuously expansionary pressure will come from the public sector. Outlays will increase at all three levels—Federal, state, and local—and should exceed their 1957 level by $100 billion—a somewhat larger margin than seemed probable a few months back.

This change in prospects has occurred primarily in the Federal area. The President's budget placed fiscal 1959 spending for goods and services at around $52 billion or some $2 billion above the 1957 level—indicating a total of $51 billion plus for the four quarters ahead. Current plans, however, call for a larger increase. Both major components of spending should exceed the budgeted level. Outlays for national security seem certain to do so—with increases for planes and military construction as well as for the more spectacular items.

All told, it now looks as though Federal spending in the four quarters ahead will run over $53 billion. It will be higher still if the line is held on foreign aid or if anything like the "stop-gap" farm price-support bills put before Congress in early March becomes law.

The current outlook is that state and local government outlays will continue to rise at their recent rate of $2.5 to $3 billion a year. If so, spending over the next four quarters should average nearly $4 billion higher than in 1957. Recession-induced drags on tax receipts will no doubt force some units to reduce their programs or trim scheduled additions. But a large number are under pressure to adhere to their expansion plans, and they will be able to do so from revenues, borrowing, and reserves.

This is a report prepared in the Business Economics Department, DUN & BRADSTREET, INC., by Edwin B. George and Robert J. Landry.

Machine-tying beats hand-tying 10 to 1

says Louis A. Weicker, Executive Vice-President, Commerce Clearing House, Inc., Chicago, Illinois

"Every day thousands of our loose leaf Reports on new tax and business law developments must be assembled and tied into bundles to meet post office requirements. Bunn equipment saves valuable time by tying out these Reports *10 times faster* than hand tying."

Machine has many uses: The efficiency and economy of Bunn Machines is not limited to tying mail. Hundreds of different items . . . from cans to laundry bundles, from bakery goods to newspapers, from meats to corrugated cardboard and cartons . . . are tied quickly and securely on Bunn Package Tying Machines.

Automatic adjustment eliminates manual changeovers. Any size or shape is tied in the same fast time . . . 1½ seconds or less.

Controlled tension reduces package breakage and product damage. The strong twine can't cut the product . . . can't slip off.

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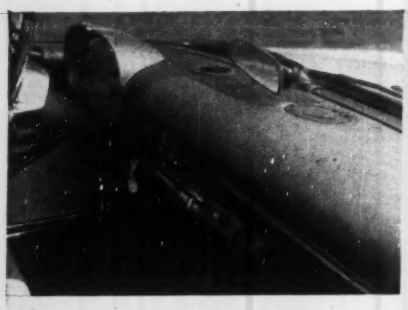

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For "leather-like" coverings for metal desk, file cabinets, and office appointments...

For stamped, light-metal luggage; instrument cases; office-machine housings...

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Short heat-cure at moderate temperatures adheres the vinyl permanently to the metal. These vinyl-dispersion finishes are so flexible, adhere so tenaciously, that prefinished sheet metal can be stamped to shape without need for final finishing.

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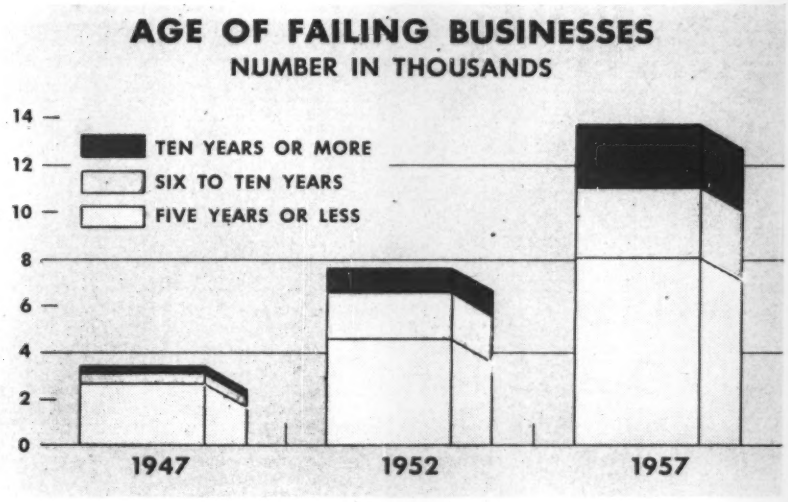


Failures largely reflect trends in the number of new businesses. Concerns less than five years old predominate, but the growing portion of those over ten years old may represent enterprises of postwar origin that are foundering as competition heightens.

FAILURES: *February Takes a Heavy Toll*

OFF SLIGHTLY because of the month's shorter length, business failures dipped to 1,238 in February. However, they exceeded by 8 per cent the number in the comparable month last year and edged 3 per cent above the prewar level of 1,202 in 1939 to reach the highest February total since 1933. But only about half as many concerns failed as in that depression February, when 2,367 casualties were reported.

Actually, the vast upward shift in the operating business population must be considered in any appraisal of the rising number of failures. Enterprises listed in the DUN & BRADSTREET *Reference Book* zoomed 35 per cent in the 25-year span between 1933 and 1958. If failures are related to these listed businesses, they were occurring this February at an annual rate of 54 per 10,000, as shown in DUN'S FAILURE INDEX. This rate was moderately lower than the prewar toll of 68 per 10,000 in 1939, and only two-fifths as severe as in February 1933, when 128 casualties occurred for each 10,000.

Although dollar liabilities edged up 1 per cent from January to $65.3 million, they fell short of the postwar record of $65.4 million in February last year. The only increase from January appeared in the $25,000-to-$100,000 size group, where casualties climbed to a new high.

Construction and service failures held even with January, but slight month-to-month dips prevailed in other lines. Most retail trades suffered fewer casualties than in the preceding month. However, upward trends persisted in the furniture and furnishings and automotive lines, lifting the total for retailers of household goods to a six-month high and

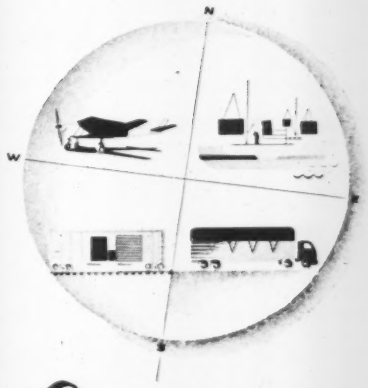
THE FAILURE RECORD

	Feb. 1958	Jan. 1958	Feb. 1957	% Chg.†
DUN'S FAILURE INDEX*				
Unadjusted	63.3	55.3	59.3	+ 7
Adjusted, seasonally	54.1	53.2	51.1	+ 6
NUMBER OF FAILURES	1,238	1,279	1,146	+ 8
NUMBER BY SIZE OF DEBT				
Under $5,000	163	199	178	− 8
$5,000–$25,000	586	603	539	+ 9
$25,000–$100,000	364	340	325	+12
Over $100,000	125	137	104	+20
NUMBER BY INDUSTRY GROUPS				
Manufacturing	208	219	199	+ 5
Wholesale trade	112	130	106	+ 6
Retail trade	662	676	568	+17
Construction	177	176	180	− 2
Commercial service	79	78	93	−15
LIABILITIES (in thousands)				
CURRENT	$65,295	$64,442	$65,406	− 0.2
TOTAL	65,652	64,535	66,200	− 1

*Apparent annual failures per 10,000 enterprises listed in the DUN & BRADSTREET *Reference Book*.

†Percentage change, February 1958 from February 1957.

In this record, a "failure" occurs when a concern is involved in a court proceeding or in a voluntary action likely to end in loss of creditors. "Current liabilities" here include obligations held by banks, officers, affiliated and supply companies, or the governments. They do not include long-term publicly held obligations.



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We make no outlandish claims about Coverlight. It combines great strength with light weight. It's waterproof, durable and resistant to acids, oils, mildew and rot. It is extremely difficult to rip or tear. It remains flexible at extreme temperatures.

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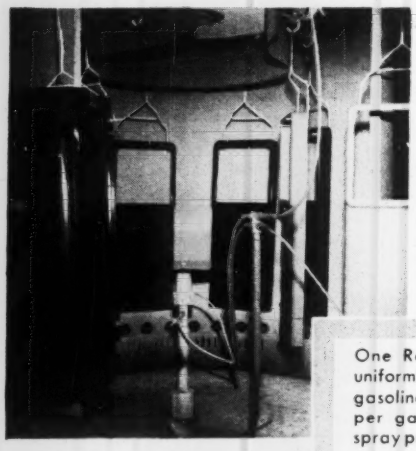
PRODUCTION MORE THAN TRIPLED . . .
PAINT MILEAGE INCREASED 75% WITH



Ransburg
NO. 2
PROCESS

One Ransburg reciprocating disk uniformly coats 7 complete sets of gasoline pump housings and parts per gallon of paint. Former hand spray produced only 4 sets per gallon.

● Bowser, Inc. Fort Wayne Division is continuously on the lookout for improved manufacturing methods in the production of their quality line of gasoline pumps.

That's why they modernized their finishing department . . . installed a conveyor . . . new oven . . . and replaced hand spray with one RANSBURG No. 2 PROCESS reciprocating disk unit.

RESULTS? Paint mileage increased 75% with less labor. With hand spray, they painted enough pump housings and parts for 4 pumps per gallon of paint. Now, with *Electrostatic*, they're painting 7 complete pump sets per gallon.

Where Bowser formerly needed two shifts in finishing, one shift now handles even greater production. With hand spray and limited oven facilities, they used to turn out 15 sets per hour. Now, they can paint 55 sets an hour, either prime or finish. Color changes are made quickly and easily with Ransburg equipment, and because of its efficiency in operation, maintenance cost in the paint area is cut 50%.

NO REASON WHY YOU CAN'T DO IT, TOO!

Whatever your product, if it's painted, we'd like to tell you more about the worthwhile savings and advantages which can be yours with RANSBURG ELECTROSTATIC PAINTING PROCESSES. Write for our No. 2 Process brochure which cites numerous examples of electrostatic spray painting on a wide variety of products.

Ransburg **ELECTRO-COATING CORP.**
Indianapolis 7, Indiana

RANSBURG

FAILURES BY DIVISION OF INDUSTRY

(Current liabilities in millions of dollars)	Number 2 Months 1958	Number 2 Months 1957	Liabilities 2 Months 1958	Liabilities 2 Months 1957
MINING, MANUFACTURING..	427	396	49.2	49.5
Mining—coal, oil, misc...	13	10	2.8	3.6
Food and kindred products.....	28	28	1.6	3.2
Textile products, apparel.	90	91	5.1	4.9
Lumber, lumber products	76	72	9.0	5.1
Paper, printing, publishing	29	23	1.3	1.0
Chemicals, allied products	6	5	0.2	0.9
Leather, leather products.	20	14	3.3	2.4
Stone, clay, glass products	13	11	2.2	0.4
Iron, steel, and products..	26	24	1.7	17.6
Machinery.....	44	43	2.8	4.7
Transportation equipment	11	13	7.5	1.0
Miscellaneous.....	71	62	11.9	4.7
WHOLESALE TRADE.....	242	197	11.4	11.6
Food and farm products.	53	42	2.3	4.1
Apparel.....	18	11	1.1	0.7
Dry-goods.....	10	2	0.3	0.1
Lumber, bldg. mats., hdwre	29	22[R]	2.6	1.1[R]
Chemicals and drugs.....	7	7[R]	0.1	0.2[R]
Motor vehicles, equipment	11	15[R]	0.2	1.0[R]
Miscellaneous.....	114	98	4.7	4.5
RETAIL TRADE.....	1338	1180	43.8	32.6
Food and liquor.....	174	191	4.2	3.1
General merchandise....	57	62	2.9	3.0
Apparel and accessories..	264	230	8.6	4.3
Furniture, furnishings....	173	173	7.0	6.2
Lumber, bldg. mats., hdwre	95	66	4.2	2.5
Automotive group.....	192	126	8.0	3.9
Eating, drinking places...	232	198	5.8	6.0
Drug stores.....	25	29	0.5	1.4
Miscellaneous.....	126	105	2.6	2.2
CONSTRUCTION.....	353	357	18.6	19.1
General bldg. contractors.	151	144	10.1	12.3
Building subcontractors..	182	187	6.9	5.5
Other contractors.....	20	26	1.5	1.2
COMMERCIAL SERVICE.....	157	164	6.7	6.6
TOTAL UNITED STATES.....	2517	2294	129.7	119.5

Liabilities are rounded to the nearest million; they do not necessarily add up to totals.
[R]Revised

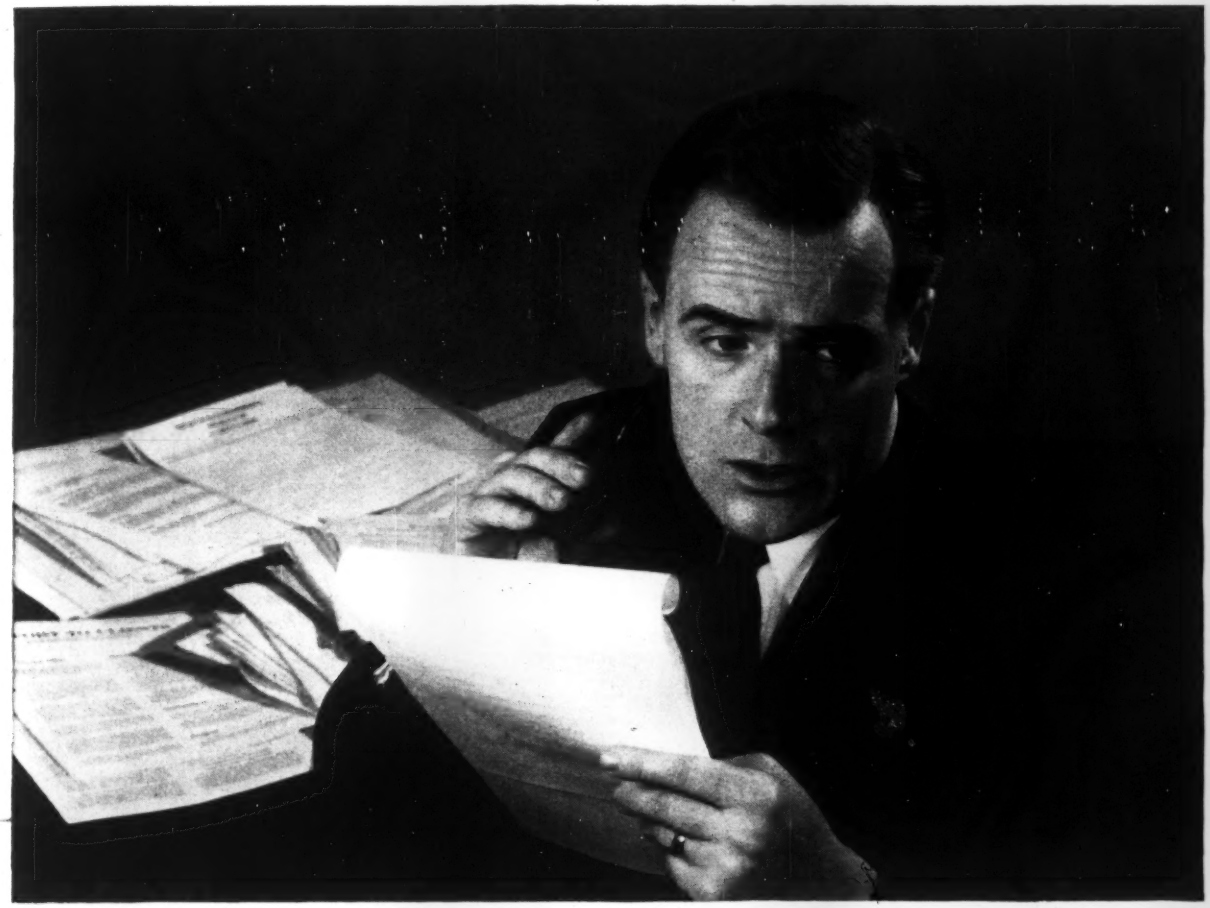
the automotive total to a record for the postwar period.

Most of the year-to-year rise was concentrated in retailing. In fact, 17 per cent more retailers failed than a year ago, about three times as steep an increase as for manufacturers or wholesalers. A few lines accounted for the upturn in retail mortality. Apparel store casualties climbed 46 per cent from last year, the automotive group 58 per cent.

For manufacturers, with a moderate over-all increase of 5 per cent, the only marked upturns appeared in the textiles and apparel industries and in paper, printing, and publishing. Neither construction nor service casualties were so heavy as last year.

Three geographic regions — the Middle Atlantic, East North Central, and Mountain states—accounted for the dip in failures between January and February. In the other six regions, business mortality continued to rise. The South Atlantic states had the largest total since 1933, and the New England states since 1949.

This report was prepared in the Business Economics Department, DUN & BRADSTREET, INC., by Rowena Wyant.



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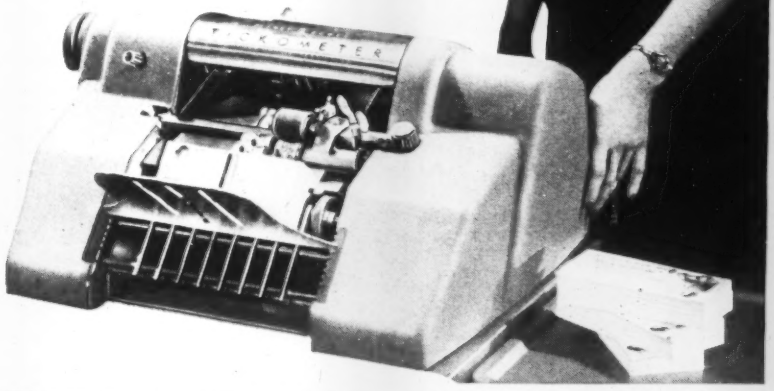
- It feeds automatically, stops for faulty items. Easy to set, and easy to operate, without skill or previous experience. Pays for itself in time saved, extra efficiency, convenience, in any office—even when used infrequently. You can rent or buy one. Pitney-Bowes has 302 service points, including 103 branch offices coast-to-coast.
- The nearest PB office will show you what a Tickometer can do in your office. Or send the coupon for free illustrated booklet and case studies.



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Made by the originator of the postage meter . . .
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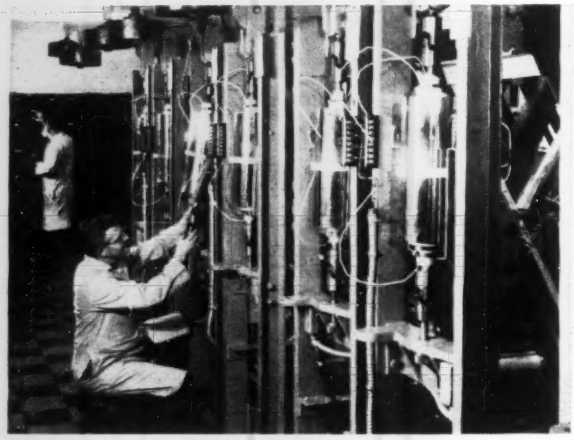
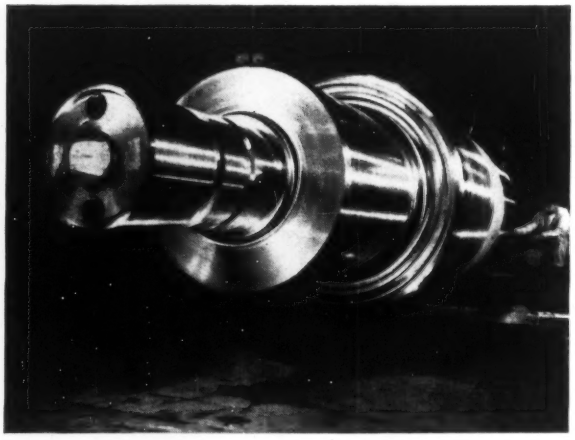
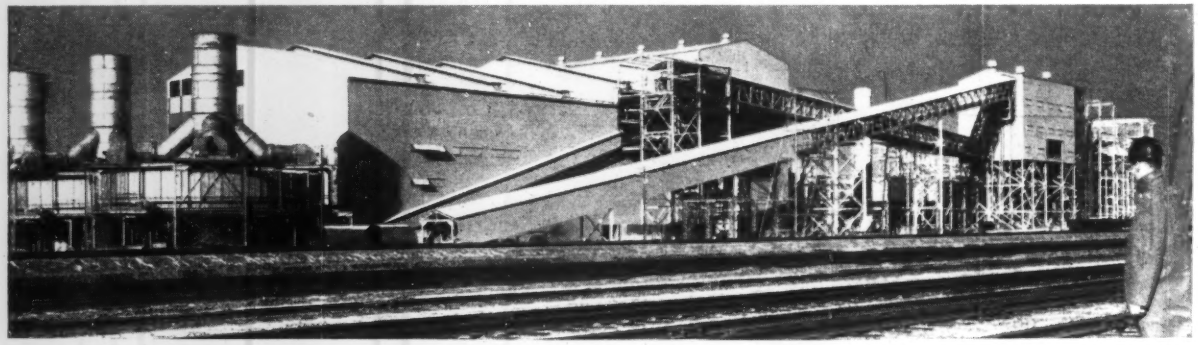
Since steel in some form touches your life every day, we think you'll be interested in what U. S. Steel is doing to keep steel the cheapest of all common metals.



In laboratories at U. S. Steel's new research center at Monroeville, Pa., we are making today's steel a better value. There, too, we are developing steel to withstand heat from atmospheric friction as no other metal can, for supersonic flights of the future. A long-range program is aimed at developing a metal twice as strong as any now existing. Here, research men are working on new high temperature alloys.



To make steel cheaper to use, U. S. Steel supplies it in hundreds of convenient forms, to thousands of individual plants which process, fabricate and assemble steel products for sale. However, even in a product that is mostly steel, the cost of the steel is one of the smallest factors. An unusual order for steel was this plate mill roll, the world's largest, forged and machined at a U. S. Steel plant.



To hold costs and prices at the lowest possible level through increased operating efficiency, U. S. Steel is continually improving its facilities. For example, shown above is one of U. S. Steel's new sintering plants scheduled to start operation in the Fall of 1958. Upon completion, the plant will produce 15,000 tons of sintered ore daily for U. S. Steel blast furnaces in the Monongahela Valley. In the face of mounting costs of new equipment and inadequate depreciation allowances, we have spent three and one-half billion dollars on improved facilities since 1945. Modernization programs in the Pittsburgh and Chicago districts, and in the West, will soon increase capacity over two million ingot tons.

Watch the United States Steel Hour on television. See your local newspapers for time and station.

USS **United States Steel**

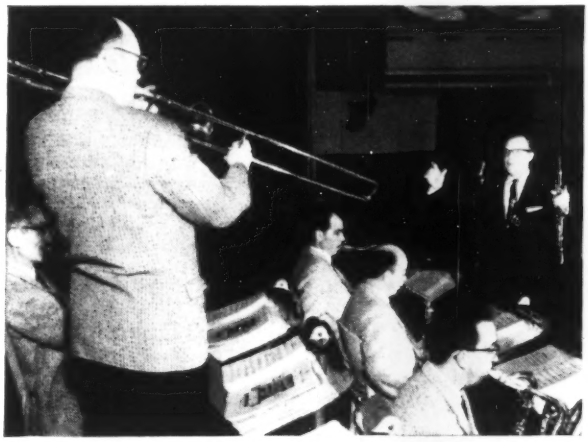
Short cuts with Recordak Microfilming

Latest reports on how this low-cost photographic process is simplifying routines for more than 100 different types of business . . . thousands of concerns

ENDS RETYPING COURT MINUTES

FORT WORTH, TEXAS

Taking pictures with a Recordak Microfilmer has eliminated the retyping of minutes for U. S. District Courts in the Northern District of Texas. This saves the time of three full-time deputy clerks, frees them for other court work. And it provides an error-free, more compact record—the equivalent of three 500-page volumes can now be kept on a single roll of Recordak Microfilm and vault-stored for greater protection.



SAVES THE MUSIC

OMAHA, NEB.

Popular bandleader Mal Dunn considers his arrangements every bit as valuable as a retailer's accounts receivable records—without them he'd be out of business.

A low-cost Recordak Junior Microfilmer lets him photograph the 10,000 single-page arrangements in his library for a fraction of a cent apiece. Not only does this increase protection, it also saves hours of reference—lets him check any arrangement quickly in the Junior's film-reader. Facsimile copies can also be made quickly from these films when needed.

LETS YOU FIND PICTURES IN SECONDS

NEW YORK, N. Y.

Hailed as the greatest advance in microfilming history, Kodamatic Indexing—*an exclusive feature of new Recordak Reliant Microfilmer*—saves time every time you view your films.

You simply dial code numbers before feeding batches of items into Reliant and "guide" lines are recorded right on the film. When you view your films (illust.) these lines lead you right to the pictures you want. New system lets you photograph batches of work at random—instead of in sequence—and still find pictures faster than ever before.

See how Recordak Microfilming can help you

☐ In Accounting ☐ Branch-Home Office Communications
☐ Billing ☐ Drafting and Engineering
☐ Market Research and Sales Analysis ☐ Personnel
☐ Record-protection and Space Savings

Free booklet, "Short cuts that Save Millions," gives typical examples of how Recordak Microfilming cuts costs for more than 100 types of business. For more specific help, call in a Recordak Systems Man. No obligation whatsoever.

RECORDAK *"Recordak" is a trademark*

(Subsidiary of Eastman Kodak Company)

originator of modern microfilming—
now in its 30th year

. . . . . MAIL COUPON TODAY . . .

RECORDAK CORPORATION
415 Madison Avenue, New York 17, N. Y.
☐ Send free copy of "Short cuts that Save Millions."
☐ Have a Recordak Systems Man contact me. MM-4

Name_____ Position_____
Company_____
Type of business_____
Street_____
City_____ State_____

Introducing Allied's

IRILAC™ #1000

New Clear Protective Coating for All Metals . . . as safe and easy to handle as Water!

New method of protection incorporates corrosion inhibitors in a water-soluble polymer base. Dries to an extremely thin, tough, durable coating—clear in color. Does not chemically affect base metal or any post-treatments. Used as a protective treatment alone or to enhance value of post-treatments.

Allied's new Irilac #1000 is a concentrated solution of a water-soluble polymer with built-in complex corrosion inhibiting materials. It was developed to answer the needs of the metalworking industry for a non-conversion process that will provide corrosion resistance and resistance to fingerprinting and abrasion on base metals and electrochemically or chemically finished surfaces—without changing the appearance of the metallic surface.

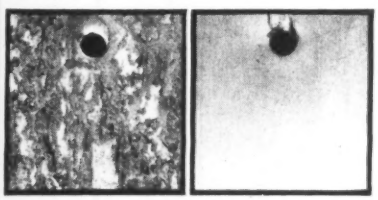
There are no hazards involved—Irilac is non-fuming, non-toxic, and requires no special fire prevention measures.

THE PROCESS

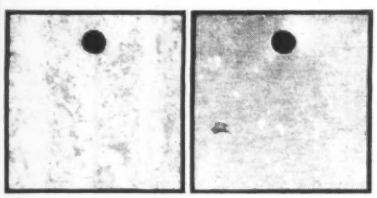
Irilac #1000 is diluted with water to provide a simple one-pass working solution. It is then applied by dip, brush or spray and forms a coating that quickly *bonds* to the metal surface without reacting with the surface.

THE PROPERTIES

The resulting coating is clear, transparent, thin yet durable. It has excellent water-resistant properties, and can be rubbed, handled and subjected to rough treatment. The surface to which Irilac has been applied is not altered—in fact, the transparent coating brings full tone to colored surfaces and clarity to iridescent surfaces. The water-thin physical characteristic of the solution means that the coating provides protection in recessed areas that are difficult, if not impossible, to protect with other methods.



STEEL PANELS: bare (left) and coated with Irilac (right) after 8-hour salt spray.



ALUMINUM PANELS: bare (left) and coated with Irilac (right) after 168-hour salt spray.

WHERE IRILAC CAN BE USED

Irilac #1000 can be applied to *any* metal—wet or dry—treated or untreated. All metals can be processed in *one* operation in the same solution. It can be applied in conjunction with any process—over Iridite, anodized, phosphated surfaces, black oxide, etc. Surfaces treated with Irilac provide a good base for paint.

APPLICATION ADVANTAGES

No other process or material available for the protection of metals offers all the application advantages found in new Irilac #1000:

1. It can be applied to *any* clean metal simply by dip, brush or spray. No special equipment is required.
2. Saves time—just apply and dry—no reaction time required.
3. No hazards involved—no exhaust or special fire protection equipment is required. Irilac is non-fuming and non-toxic.
4. Saves space. Presents no disposal problem. Low in first and final costs.

Because of its versatility and complete safety, Irilac has unlimited uses. For example, it will protect aluminum furniture, brass hardware and fixtures, steel parts of all types, zinc castings, etc. In fact, any base metal or plated surface, or those treated with electrolytic or chemical post-treatments, can be improved or enhanced with Irilac.

IRILAC #1000 MAY BE THE ANSWER TO YOUR PROTECTION PROBLEM

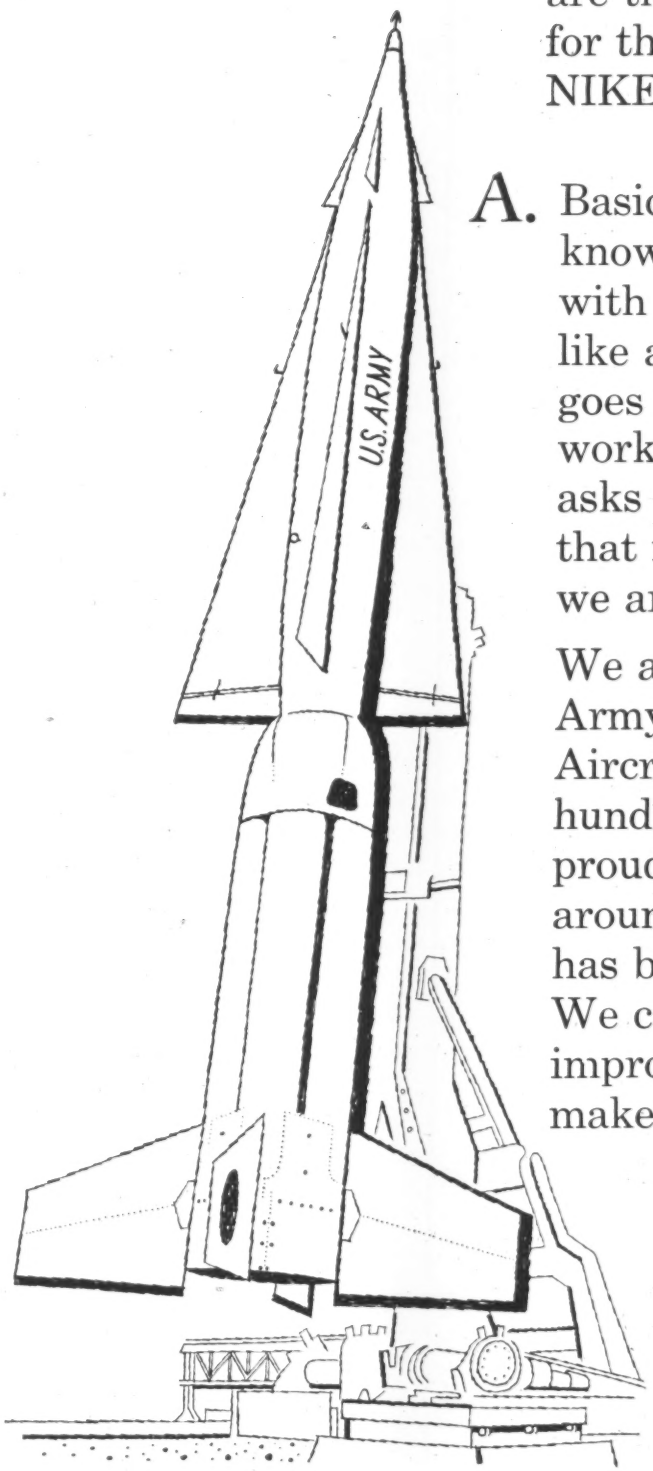
Our development staff will be glad to work with you to determine the significant benefits Irilac can offer you. Simply send us some parts and let us show you what Irilac can do. No obligation, of course.

Allied Research Products, Inc.

4004-06 EAST MONUMENT STREET
BALTIMORE 5, MARYLAND

***Manufacturers of* IRIDITE®, IRILAC™, ARP® Brighteners and Plating Chemicals**
West Coast Licensee: L. H. Butcher Co.

Q. Western Electric makes Bell telephones – so why are they the prime contractor for the U.S. Army's NIKE guided missile system?



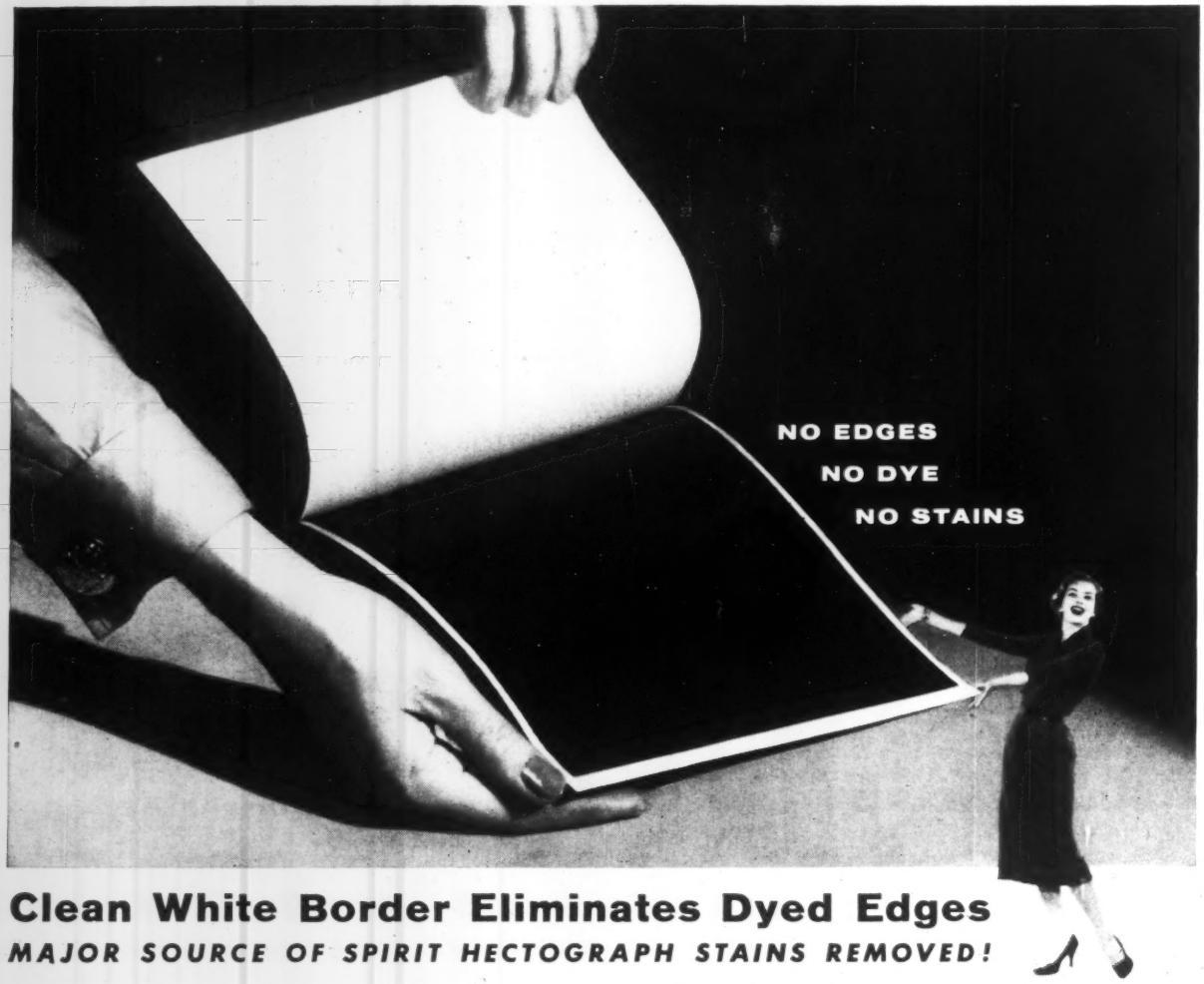
A. Basically it is "know-how"; that is, knowing how to meld research with production so they work like a single operation. This goes on daily in our Bell System work and when Uncle Sam asks us to take on a job that needs this "know-how" we are ready to go.

We and our teammates on the Army's NIKE project – Douglas Aircraft, Bell Laboratories and hundreds of sub-contractors – are proud that NIKE is operational around United States cities, has been for over 4 years. We can report, too, that major improvements are on the way to make NIKE even better.

Western Electric

MANUFACTURING AND SUPPLY UNIT OF THE BELL SYSTEM

NEW CLASSIC READY-MASTER



Clean White Border Eliminates Dyed Edges

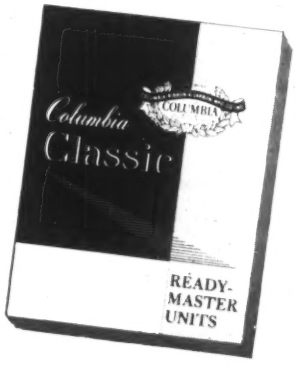
MAJOR SOURCE OF SPIRIT HECTOGRAPH STAINS REMOVED!

Dyed edges of the master—long the biggest source of stains, smears and annoyance in spirit duplicating—have been eliminated by Columbia's new Classic Ready-Master Unit.

The hectograph coating of the new Classic Ready-Master is sealed off short of the edges—leaving a clean, *dye-free* border to handle. *There's no dye to rub off, stain and travel from typewriter to duplicator to files, either.* Everybody and everything connected with your spirit duplicating stays cleaner with new Classic Ready-Master Units!

The new Classic Ready-Master Unit incorporates these *additional* features: Tru-Guide Indicia, Tempflo Supercoating and Folded Construction . . . *additional* guarantees of long, brilliant runs and re-runs!

FREE SAMPLE—See for yourself the new cleanliness new Classic Ready-Masters will bring to your spirit duplicating. For free sample write, using company letterhead: Columbia Ribbon & Carbon Mfg. Co., Inc., 814 Herb Hill Road, Glen Cove, N.Y.



CLASSIC READY-MASTER BY *Columbia*

COLUMBIA RIBBON AND CARBON MFG. CO., INC., GLEN COVE, NEW YORK
COLUMBIA RIBBON AND CARBON PACIFIC, INC., DUARTE, CALIFORNIA

Now the world's most dependable lighter has a running mate

The Zippo Slim-Lighter is here!

ZIPPO ANNOUNCES the Slim-Lighter. This distinguished new lighter is slim and light—and yet it is as dependable as the original Zippo!

If you have been pondering about employee awards to spur incentive, safety or recognition programs, then the new Zippo Slim-Lighter offers the perfect solution.

Giving the new Slim-Lighters is also a way to show appreciation for customer courtesies in a manner that will not embarrass them or you. Your thoughtfulness will never be forgotten because a Zippo is made to *work* and if it ever fails to work *we'll fix it free!*

The regular and new Zippo Slim-Lighters are available in a wide range of designs and finishes. Our design department will be glad to help you *individualize* and even personalize your Zippos with individual signatures.

Zippo Manufacturing Co., Bradford, Pa., and Canada Ltd., Niagara Falls, Ont.

Zippo Manufacturing Company
Dept DR144, Bradford, Pa.

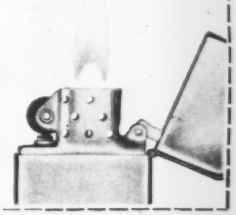
Gentlemen: Please furnish us with complete information on how Zippo Lighters can be of service to our company.

Name _____ **Position** _____

Firm _____

Address _____

ZIPPO.
THE LIGHTER
THAT WORKS



MEET A MATERIAL SO TOUGH IT PROTECTS STEEL PILES . . . .

Twenty strokes per minute, ten hours a day, the nine-ton hammer of this giant pile driver smashes down on a disk of National Vulcanized Fibre. To protect steel piles from splitting or buckling, the two-inch-thick laminated disk withstands this battering for a full ten hours. Here's proof that Vulcanized Fibre is one of the strongest materials known, per unit weight. But the really important thing is Vulcanized Fibre's versatility. You can prove this for yourself. Send for our new kit of samples and give them your toughest tests. You'll most likely find a product-improving idea. Others have—for 99 years.

Here's the disk that takes the battering

Vulcanized Fibre is *recognized* as one of the strongest materials known, per unit weight. The really surprising thing about this rugged, rough-duty material is its use in thousands of critical applications: delicate instruments, chemically inert suture reels, arc chutes for lightning arrestors, flexible backings for abrasive disks, torque-resisting cams and gears, insulation for railroad signal relay systems. The list of applications is almost endless.

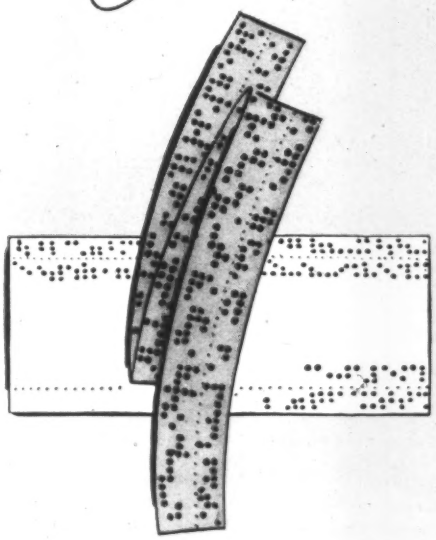
Our own Kennett Materials Handling Receptacles and Lestershire Textile Bobbins get their light weight, glass-like smoothness and long life from Vulcanized Fibre.

Among engineering materials, Vulcanized Fibre is unique and surprisingly low in cost. It weighs only half as much as aluminum. It absorbs sudden repeated shocks and impacts without failure. It has outstanding arc resistance, low thermal conductivity, excellent resilience and high abrasion resistance. And it can even be formed or deep drawn into intricate shapes—as well as machined, polished, painted, embossed and combined with other materials, such as aluminum, wood, rubber, or copper! It is available in many forms and sizes.

Send for samples today—and ask about the use of Vulcanized Fibre in any product that's giving you trouble. Write direct to Dept. I-4.

NATIONAL
VULCANIZED FIBRE CO
WILMINGTON 99, DELAWARE
In Canada:
NATIONAL FIBRE COMPANY OF CANADA, LTD., Toronto 3, Ontario

Are Your Filing Methods As Fast as Your Machines?



ACME VISIBLE

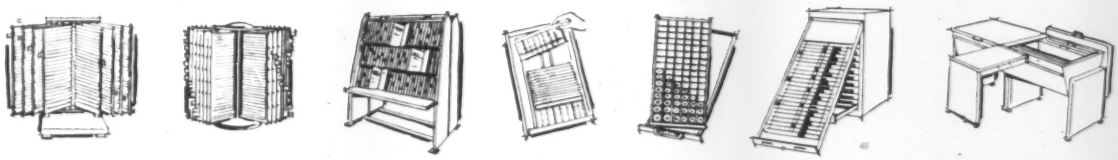
speeds the availability of source material provides accessible filing of the products of

AUTOMATION

Electronic machines produce punched cards and tapes at astounding speed. Once punched they become permanent records to be used over and over again. Acme Visible Records and equipment provide for filing and fast finding, with SEEABLE indexing that speeds the handling of this material to keep pace with the machines.

ACME VISIBLE RECORDS, INC.
Crozet, Virginia

District Offices and Representatives in Principal Cities



DESK STANDS - ROTARIES - FLOOR STANDS - CARD HOLDERS - CABINETS - TRAYS - EXPANDER CABINETS

Ask the man from Acme
to show you samples

B-458

ACME VISIBLE RECORDS, Inc., Crozet, Virginia

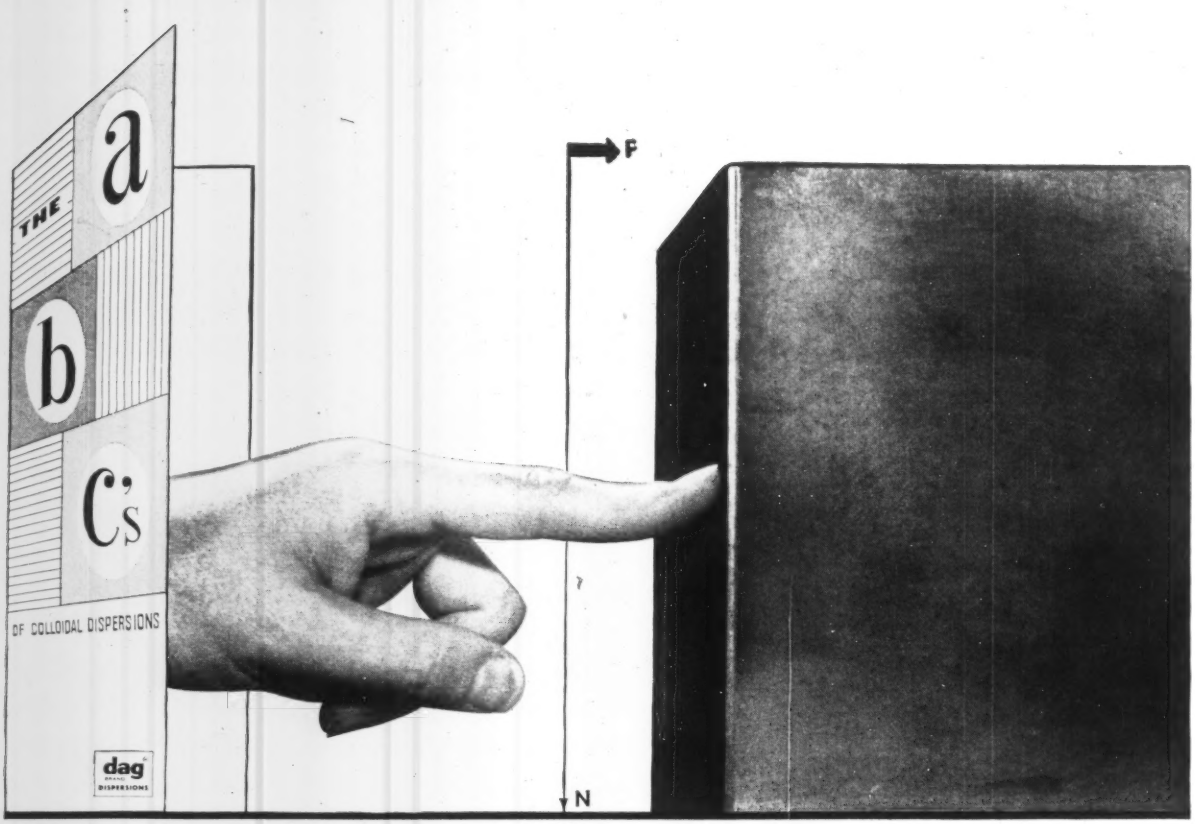
☐ We are interested in Acme Visible Equipment for _____ records.
kind of record

☐ Have representative call. Date _____ Time _____

Company _____ Attention _____

Address _____

City _____ Zone _____ State _____



Less drag with dag®

. . . colloidal dispersions, the Acheson brand of lubricants and additives that provide the *line of least resistance.*

This extremely low coefficient of friction which characterizes a colloidal graphite film has proven to be a boon to industry since it was discovered and introduced by Dr. Edward Goodrich Acheson over fifty years ago. Added to conventional lubricants, 'dag' brand products are providing additional lubricity in assembly, run-in, and metal-working applications. Also, deposited as dry-film lubricants they have proven to be highly effective in metal forming, casting, and parting as well as a conductive coating in electrical and electronic applications. The chances are that these versatile Acheson products are either being used currently in your operations *or that they should be if you are to gain maximum efficiency!*

Conceding the fact that such products can provide concrete operating savings and/or production efficiencies, the question might logically be asked, "Why should it be an Acheson 'dag' brand colloidal dispersion?" Since the days of the pioneer inventor, Dr. Edward Goodrich Acheson, and continuing through the present, Acheson Colloids Company has led the field in the development of finer, more universally benefiting dispersions of graphite, molybdenum disulfide, vermiculite, and other solids. Exclusive processing techniques allow the reduction of solid particles to "colloidal" size . . . *less than forty millionths of an inch in diameter!* This microscopic fineness permits wider surface coverage, deeper penetration, and near-permanent suspension in the various liquid carriers employed. Many busy executives have learned that it pays to know about Acheson 'dag' brand dispersions. For more detailed information, described in laymen's terms, of the many types of Acheson materials available and their advantages, remind your secretary today to send for your copy of "The ABC's of Colloidal Dispersions". Write Dept. DR-48.

1958 marks the fiftieth year that Acheson Colloids Company has served industry. New laboratory developments are already promising even more widespread uses for Colloidal Dispersions — and corresponding benefits for you.

50th

Golden year for...

ACHESON *Colloids Company*

PORT HURON, MICHIGAN

A division of Acheson Industries, Inc.

Also Acheson Industries (Europe) Ltd. and affiliates, London, England

Offices In:

Boston • Chicago • Cleveland • Dayton • Detroit • Los Angeles • Milwaukee
New York • Philadelphia • Pittsburgh • Rochester • St. Louis • Toronto

Tomorrow's completely automatic typewriter. You talk into a microphone—an electronic brain does the rest, may even translate your letter into foreign languages. Thompson Products has the engineering skill and manpower that can help you build machines like this.

Want to build a girl-less typewriter?

***Thompson Products** can help you handle the job*

One fine day, a smart manufacturer will want to make such a machine. When he does, Thompson Products will be ready to help him design and build the needed components.

Sure, a girl-less typewriter seems ahead of its time. So were a lot of other products to which Thompson scientists and engineers have made important contributions. Since early in the century they've researched and built complex, hard-to-make parts, assemblies and systems for many of America's leading industries.

If you have a new product in the "think stage" let us help you do some of the thinking, development and manufacturing.

You can count on

Thompson Products

From Thompson's 19 research centers and 25 manufacturing plants come, every year, important new advances in mechanics, electronics, hydraulics, pneumatics, aerodynamics, thermodynamics and nucleonics. Why not take advantage of the engineering ingenuity, production facilities and available manpower which Thompson offers?

as a partner in solving the design and production problems of an advancing technology

General Offices, Cleveland 17, Ohio

Highlights from COMMERCIAL CREDIT'S 46th ANNUAL REPORT

FINANCE COMPANIES
Wholesale Financing
Instalment Financing
Commercial Financing
Equipment Financing
Fleet Lease Financing
Rediscounting
Direct Loans
Factoring

INSURANCE COMPANIES
Automobile Insurance
Credit Insurance
Health Insurance
Life Insurance

MANUFACTURING COMPANIES
Pork Products
Metal Products
Heavy Machinery and Castings
Malleable, Grey Iron and Brass Pipe Fittings
Metal Specialties
Roller and Ball Bearing Equipment
Machine Tools
Toy Specialties
Pyrotechnics
Printing Machinery
Valves

	1957	1956
GROSS INCOME	$ 174 725 311	$ 161 568 389
NET INCOME:		
Net income before interest and discount charges	$ 98 963 983	$ 88 670 050
Interest and discount charges	47 699 540	37 133 947
Net income from current operations, before taxes	$ 51 264 443	$ 51 536 103
United States and Canadian income taxes	24 367 474	25 057 432
Net income credited to earned surplus	$ 26 896 969	$ 26 478 671
Net income per share on common stock	$5 33	$5 26
Common shares outstanding at end of period	5 045 565	5 033 645
RESERVES:		
Losses on receivables	$ 19 170 217	$ 19 659 794
Unearned income on instalment receivables	80 900 216	73 538 302
Unearned premiums—Insurance Companies	31 915 207	33 676 702
Available for credit to future operations	$ 131 985 640	$ 126 874 798
Operations shown separately are, briefly:		
FINANCE COMPANIES:		
Gross receivables acquired: Motor, finance leases and farm equipment retail instalment	$ 821 342 285	$ 794 433 539
Other retail instalment	96 828 829	120 314 599
Direct and personal loans	131 365 861	108 651 670
Motor, farm equipment and other wholesale notes and advances	1 553 479 488	1 184 503 981
Factoring, open accounts, notes, etc.	1 227 421 903	1 179 184 205
Total receivables acquired	$3 830 438 366	$3 387 087 994
Total receivables outstanding December 31	$1 447 184 063	$1 296 831 241
Net income of Finance Companies	15 824 956	16 569 774
INSURANCE COMPANIES:		
Written premiums, prior to reinsurance	$ 34 632 251	$ 33 106 362
Earned premiums	35 161 496	36 943 437
Net income (including Cavalier Life Insurance Co.)	6 820 050	5 777 288
MANUFACTURING COMPANIES:		
Net sales	$ 136 321 975	$ 118 976 584
Net income	4 251 963	4 131 609

COMMERCIAL CREDIT PLAN

Offering services through subsidiaries in more than 400 offices in the United States and the Dominion of Canada.

COMMERCIAL CREDIT COMPANY *Baltimore 2, Maryland*

Copies of our 46th Annual Report available upon request

NO MORE FILING GYMNASTICS!

NEW MOSLER REVO-FILE obsoletes all other systems

Only Mosler's Revolutionary rotary active card file can: *Cut reference time to 1½ seconds.* Revo-File makes flap-flipping and tub-tugging old-fashioned. One quick spin gives you your card. *Save 500% in space.* Mosler Revo-File contains five times as many cards as other systems hold in the same space. *Reduce all finding locations to just one.* Clerks work comfortably seated. Revo-File brings the cards to them! The one finding location is at the top of the drum. *Save $200 in changeover costs.* Just take present cards and drop them into Revo-File. No hole-punching! No extra work! It's amazing! Send coupon today.

NEW **MOSLER** REVO-FILE

the modern rotary card file . . .
another fine product of The Mosler Safe Co.

REVO-FILE DIVISION • THE MOSLER SAFE CO.
Department DR-458, 320 Fifth Avenue, New York 1, N. Y.

Gentlemen: I have 2,500 or more cards and—

☐ **I am interested in a free 30-day office trial of Mosler Revo-File.**

☐ **I am interested in additional information on Mosler Revo-File.**

Name _____

Position _____

Company _____

City _____ **Zone** ____ **State** _____

revolutionary New ONE STEP process

"I LEARNED A LOT FROM 75 MILLION MILES

. . . that's why I use Fords 100% in my Railroad Transfer Service fleet," says Mr. J. L. Keeshin, President Railroad Transfer Service, Inc.

"My experience through 43 years and millions of miles of truck fleet operation from coast to coast has emphasized the fact that Ford is unmatched for all the qualities most important to fleet owners—dependability, low running costs, get-up-and-go, good solid value. That's why I switched 100% to Fords when I took over the Railroad Transfer Service in 1956.

"We now operate 65 Ford passenger vehicles and 14 truck tractors. Most of this equipment runs 21 hours per day, 7 days a week, 52 weeks of the year, clocking nearly three quarters of a million miles annually. Absolute dependability is a must. Vehicles are operated for 30 months without major overhaul and only replaced to capitalize on Ford styling and engineering advances. We overlook *nothing* that will help us in maintaining a profitable fleet operation—in equipment, Fords have what it takes!"

Central Station, Chicago, Illinois

FORD FLEET "STAYING" POWER IS PAYING POWER

When fleet owners get the facts they go Ford. There's value you can bank on to begin with, low running costs, less downtime as the miles roll by. Only Ford cars offer the economy of short-stroke Six and Thunderbird V-8 engines. Compared to its nearest competitor, the 58 Ford is the most durably built . . . best weatherproofed and insulated . . . has the highest quality upholsteries . . . the only double-sealed brakes and a real payload of other features that put Ford first in line for economy, durability and all-round value. These are only a few of the reasons why Fords are preferred for fleet use. Your nearest Ford Dealer can prove it! See him soon . . . this is only the beginning of the story.

***Dependability is the byword of* 58 FORD FLEETS**

PROVED AND APPROVED AROUND THE WORLD

revolutionary New ONE STEP process

Copies anything LIGHTNING FAST!

APECO Auto-Stat® UNI-MATIC

JUST PLUG IT IN *ANYWHERE*

copy in FIVE colors... anything written, printed, typed, drawn or photographed right in your own office.

The new Apeco Uni-Matic Auto-Stat is the greatest advancement in office copying in the last ten years. It is the culmination of years of research and engineering.

This revolutionary machine makes copies in half the time of other photocopy makers. It is so simple to operate—anyone is an expert the first time he uses it. The Apeco Uni-Matic Auto-Stat copies any original — any color—on opaque or transparent paper . . . printed on one or both sides. It is handsome, compact, and light weight. Offers hundreds of time and money saving uses at a price within the budget of the smallest firm.

High Speed "Synchro-Copying"

ONE INSTANT AUTOMATIC STEP . . .

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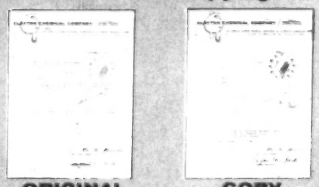

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WASHINGTON, D.C.—In terms of legislation that has reached the statute books, Congress has thus far made a poor showing. And it is being criticized for failure to act on bills that were already advanced when the first session of this Congress adjourned. If legislation were speeded up in the early months of a session, the pressure in the months immediately preceding adjournment would be relieved. Night sessions and hasty action make for defective laws.

One reason for the lack of progress since January is election-year nerves. Concern over their campaigns distracts members from their legislative duties and they fly home weekends to do a little fence mending in their constituencies.

But despite the poor showing in laws enacted, the members of the House Ways and Means Committee in particular cannot be accused of soldiering. The Committee and its staff have worked diligently since early January. They have been confronted with uncertain economic conditions and an enormous work load. Many decisions were held in abeyance until March figures on business conditions and unemployment were available. But once the committee reports on a tax measure, it will be promptly considered because of the bearing it will have on the economy generally.

What happens to the tax bill will depend on the course of business, but such a good case has been made for a reduction in the tax on corporations as a stimulus to employment that this may be voted, along with some reduction in the excises and relief for those in the lower income brackets. A limit of fifteen or eighteen months may be placed on the reductions so that there will be no indefinite extension of deficit financing.

Members of the Ways and Means Committee are making it clear that they will not hesitate to compromise where a reasonable case can be made against the provisions of their bill. They want to get the bill passed quickly.

About the last thing protectionist members of Congress want is the lapse of the Reciprocal Trade Agreements law. They realize that this would cause such an upheaval that reenactment of the statute in an even more liberal form would be likely. Some friends of the measure say they will vote against a one-year extension on the theory that so short an extension would be almost as bad as no bill. And if amendments impair the measure too much, or if the extension period is inadequate, the President could return the bill to Congress, specifying the changes necessary for his approval.

In his conferences with Republican leaders in Congress, the President is emphasizing the importance of foreign trade. His recommendations are summed up in his annual economic report: "Vigorous growth abroad will help fulfil unusual aspirations for economic betterment and promote a rising level of demand for United States goods and services." Mr. Eisenhower also emphasized that the outflow of dollar payments reinforces economic expansion here and abroad.

Foreign aid legislation is in less trouble than the extension of the Reciprocal Trade Agreements Act. The winning arguments seem to be that more defense per dollar can be provided in the allied countries than would be obtainable here and that any substantial reduction in the appropriation would mean calling up more men for military training.

A decline in the political influence of organized labor is evident in the attitude of members of Congress. It may not be strongly reflected in bills enacted at this session of Congress, but the impact of the McClellan disclosures is expected to have a more immediate effect on state legislation.

Congress faces a knotty problem in writing a farm bill that the President will approve. Vice President Nixon, who has had marked success in ironing out differences in the Republican party, is finding it difficult to reconcile the views of the farm-state Senators, who want Secretary Ezra Taft Benson ousted, with the unexpectedly strong support that is developing for Benson in Congress. Many believe that in the long run his plan will prove best for the farmer and the consumer and that it will lift some of the burden from the shoulders of the taxpayer. There is also more farm support for Benson's proposals than had been anticipated.

With "fair-trade" laws being held unconstitutional in several states, a drive is on to get a tighter Federal statute "to equalize rights in the distribution of identifiable products in free and open competition." In the form of an amendment to the Federal Trade Commission Act, the bill

Beneficial Reports for 1957

Beneficial Finance SYSTEM

- **more money loaned to families than ever before**
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The year 1957 was a good year for Beneficial with net Instalment Notes Receivable up $50 million to a new high total of $492 million at the year-end. Earnings exceeded $20 million and assets passed the half-billion-dollar mark.

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. . . a BENEFICIAL loan is for a beneficial purpose.

HIGHLIGHTS	1957	1956
Net Income	$ 20,152,232	$ 18,685,686
Net Income per Common Share (adjusted to present capitalization)	$1.91	$1.76
*Cash Dividends per Common Share	$1.00	$1.00
Total Assets	$511,768,524	$462,492,129
Amount of Loans Made	$754,673,124	$739,041,925
Number of Offices	1,089	1,023
Instalment Notes Receivable (after deducting Unearned Discount)	$492,742,936	$442,283,634

*Cash dividends actually paid on the Common Stock were $1.00 per share for 1957 and 1956. Adjusted to present capitalization, such per share amounts were equal to $.95 and $.85, respectively.

The information contained herein should be read in conjunction with the financial statements and notes appearing in the 1957 Annual Report to Stockholders. A COPY OF THE REPORT WILL BE FURNISHED UPON REQUEST.

Beneficial Finance Co.

Beneficial Building, Wilmington, Delaware

MORE THAN 1,000 OFFICES IN THE UNITED STATES, CANADA, HAWAII AND ALASKA

would "permit the small manufacturer to compete with larger concerns." No plans have been made for hearings. Some are of the opinion that at this session Congress will not consider legislation that might increase prices.

Congress is expected to make appropriations for more public works projects than the Budget Bureau will approve. That probably means another veto. Army Engineers have made a good case for some of their projects, which can provide employment overnight and are free of right-of-way litigation and other factors that make for delay.

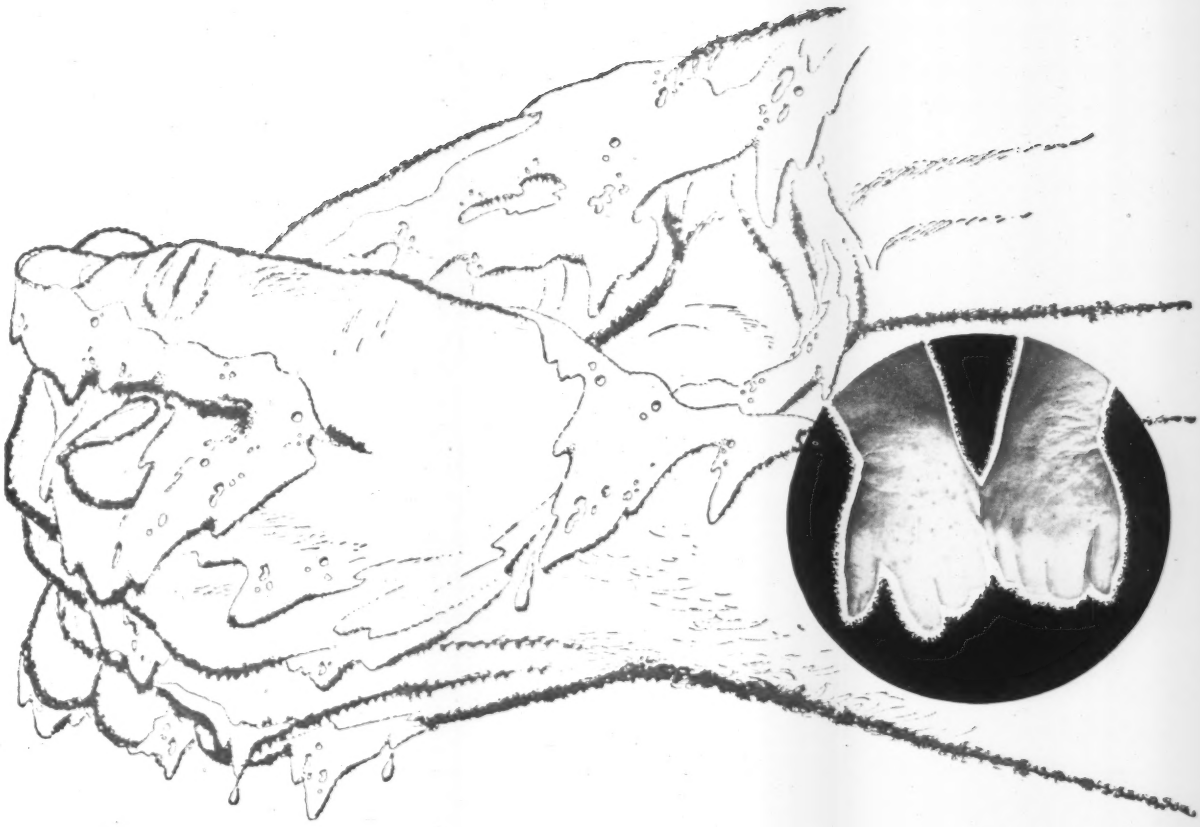
Credit banks for small business patterned after the land banks have strong support. Opposition comes from lawmakers who want to wait until the Federal Reserve report on small business has been completed.

Housing bids fair to get favorable legislation. The Federal Housing Administration will be liberalized. Funds for the Federal National Mortgage Association will be increased. Urban renewal will get more money, and the public housing program will be expanded.

Announcement of the tolls to be charged on the St. Lawrence seaway is being impatiently awaited by those concerned with navigation on that waterway. Midwestern interests hope the rates will be low. Atlantic and Gulf ports interests hope rates will be high enough to discourage diversion of tonnage. Some members of Congress feel that the Corps of Engineers is better qualified to operate the seaway than is the St. Lawrence Seaway Corp. That change would require legislation.

Rail lines made a good showing at hearings before the Interstate Commerce Committee of the Senate, but chances are slim for curtailing the regulatory powers of the Interstate Commerce Commission.

Paul Wooton



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THEY *get to take a last look inside*

Standard Oil research develops method for inspecting lubrication of enclosed parts without disassembling

What if you had to make a final inspection of enclosed parts to be sure they were lubricated and you could not do it without disassembling? Standard Oil research scientists have just developed an instrument system that determines lubricant level in an instant. The device measures the density of an assembly so precisely the presence or absence of the desired quantity of lubricant registers on a meter.

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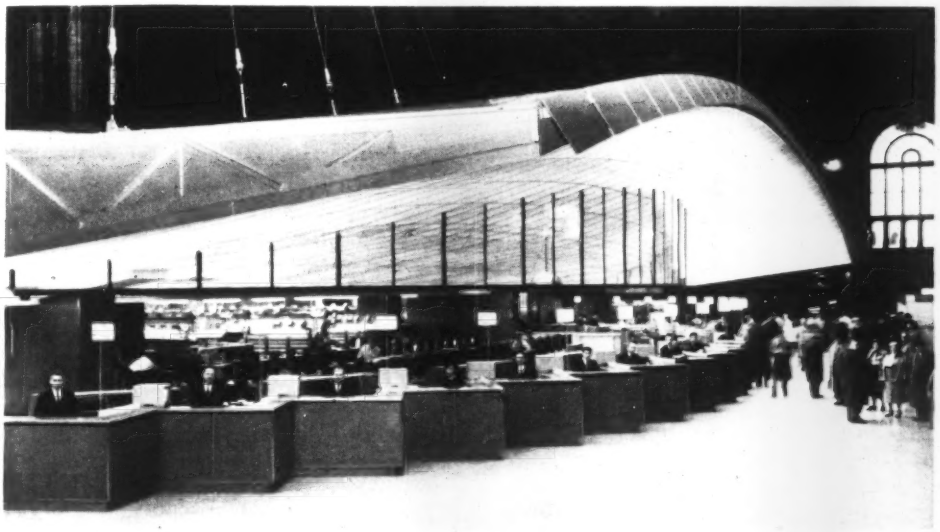
INDUSTRY FIGHTS BACK
on State and Local Taxes



BOON THAT ALMOST BACKFIRED: This electronic marvel nearly upped Pennsy's assessment $2 million.

MELVIN J. GOLDBERG

Instead of running away from excessive taxation, many companies today are staying to fight it out. They're finding that informed public opinion can be a powerful ally in the battle for equitable tax treatment.

THE PENNSYLVANIA Railroad swelled with justifiable pride when it opened a new ticket bureau in New York's Pennsylvania Station last year. Press releases trumpeted the glories of its "$2 million electronic marvel."

No one read of the new facility with greater interest—or greater pleasure—than the New York City tax assessor. The city promptly increased the station's property tax assessment by Pennsy's self-proclaimed figure, $2 million.

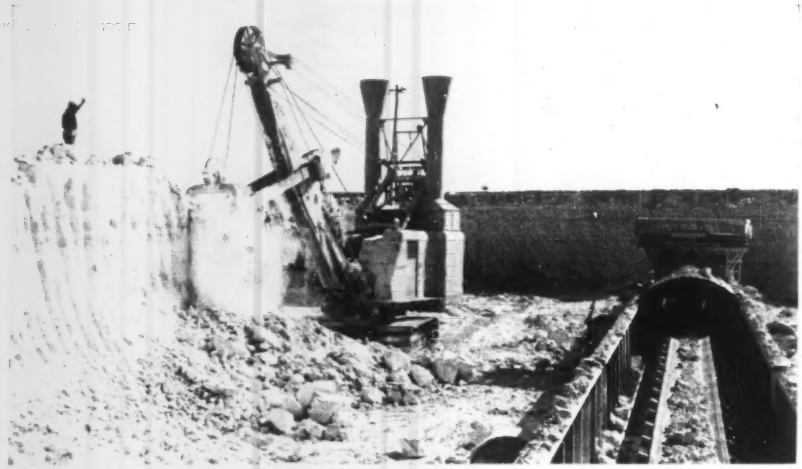
The episode illustrates that no business activity, not even press agentry, is free of state and local tax complications. It also illustrates that these levies are not a fixed and immutable thing, beyond the pale of correction by mere taxpayers. Officials of the railroad proved that while the $2 million figure was accurate as far as it went, much of it represented leased equipment not subject to tax. The assessment was reduced to $825,000.

Federal taxes have risen fast in the last decade, but state and municipal taxes have risen faster. Since 1946 state levies alone have increased 171 per cent. During the same period, Federal taxes increased a comparatively small 81 per cent. For the 1957 fiscal year state tax collections were $14.5 billion, and local taxes were about the same.

Of course, a rise in local taxes was inevitable after the war. States and cities faced a huge backlog of necessary projects, a backlog that still hasn't been whittled away. And local governments, like their constituents, were forced to pay more for goods and services. After a recent survey, the Tax Foundation concluded that, "In general, most states have done an excellent job of holding the line on spending and taxes, despite many pressures for new and enlarged programs."

Industry must, of course, bear its fair share of the state and local tax burden. But in a few places the levies on business, when compared to those in neighboring localities and on competing industries, have gone beyond the limits of "fair."

Of course, Federal taxes still dwarf the state and local total, but two factors other than size make



TRAPPED IN A MINE: Freeport Sulphur couldn't move its Louisiana mine (above) out of the state. So it carried its tax troubles to the people and won a victory with their support.

state and local taxes important to business men. First, more than two-thirds of all state levies are paid by business or collected from business. Less than half of Federal taxes come from such sources. Second, Federal taxes apply equally throughout the country. There is no escape anywhere, short of leaving the country. A manufacturer in New York contemplating his Federal tax at least has the satisfaction, however grim, of knowing that his competitor in California must pay at exactly the same rate.

Not so with state and local taxes. The differences, sometimes wide, between neighboring states and cities give these levies an importance out of all relation to their size. For a highly centralized company, a local tax can be far more damaging competitively than the Federal bill.

Some Came Out Fighting

The past few years will probably be remembered for the rapid increase in state and local taxes. They will also be remembered for the firm stand industry has taken against excessive taxes. Some companies have sought "low tax" states for new plants, and others have moved established plants. Still others have declined to move. Instead they stood fast and campaigned for lower taxes.

To be sure, not all efforts to escape unfair local taxes have succeeded. But they have succeeded often enough to give encouragement to companies faced with the problem.

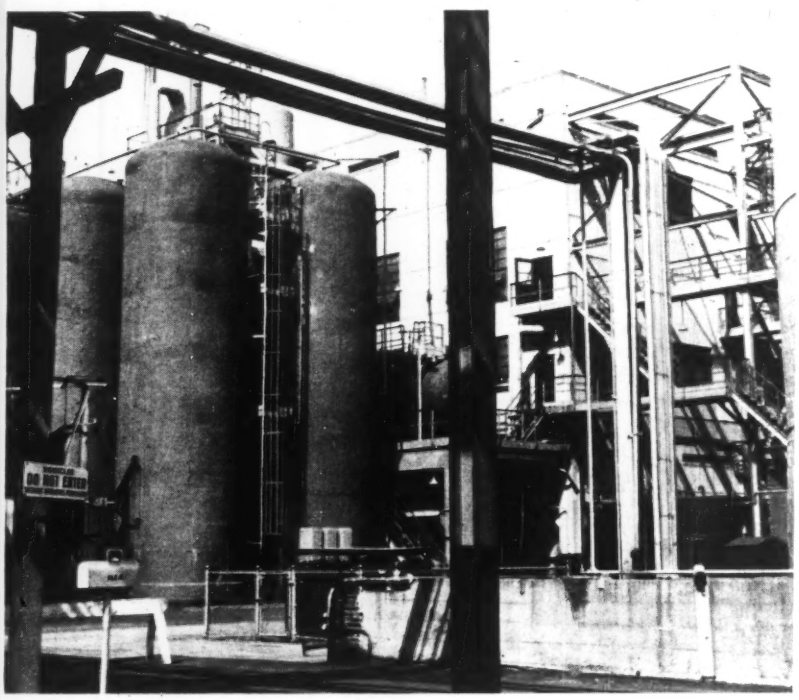
In the Spring of 1956, Louisiana's Governor Earl K. Long proposed raising the state's severance tax on sulphur from $1.03 a ton to $3 a ton. Most directly affected by the proposal was the Freeport Sulphur Company, which produces 95 per cent of the state's sulphur. Its competitors across the state line in Texas paid a $1.40 tax. The Mexican mines were taxed only 30 cents, and their workers got less for a day's work than Freeport paid for an hour. Nearly all the Louisiana mines were in high-cost marshy areas. The Texas and Mexico mines were on firm high ground.

"The tax would have put us at a very severe competitive disadvantage," says Freeport vice president J.C. Carrington. "For us there was no question of leaving the state. You can't move a sulphur mine. We had to stand our ground and fight."

The Public Helps

Only public opinion could help Freeport. In a series of newspaper advertisements the company told what the tax would do to the sulphur industry in the state. Company officials appeared over radio and television to publicize the unfairness of singling out one company for a tripled tax.

The company then prepared a booklet, *Don't Put the Brakes on Progress.* It sent 15,000 copies to customers, suppliers, stockholders, and civic leaders throughout the state. "In 1936," the booklet said, "the Louisiana severance tax on sulphur was upped to $2 a ton, well above the tax in Texas. Because of this inequity, Louisiana production fell off 23 per cent while Texas production climbed 37 per cent. Jobs, payrolls, and purchases fell off with it. Then



A STRONG CASE: The Bayonne (N.J.) refinery of Esso Standard could have left town. Instead, it fought for tax relief. Victory made possible this new wax-separating unit.

in 1938 Louisiana citizens, aware of the damaging effect of the high tax, voted to put the rate on a par with the $1.03 rate then in effect in Texas . . . Production since then has climbed by more than 500 per cent."

Support for the company in its fight came from all sides, including its own employees. "Drillers and roustabouts came up to me and asked how they could help," one company official relates.

The company sent letters to its workers, and meetings were held with their foremen. Freeport people discussed the tax with their neighbors, wrote letters to their representatives, and even visited them.

An Informed Press Speaks Its Mind
Here's What They're Saying About the Sulphur Tax
LOUISIANA PRESS
TEXAS PRESS
NATIONAL PRESS
Don't Put the Brakes on Progress!
FREEPORT SULPHUR COMPANY

MORE WAYS THAN ONE: Booklets, fliers, reprints—all help to put across industry's case against excessive state taxation. Here is how Freeport Sulphur and eleven railroads in New Jersey publicized their causes.

Louisiana newspapers also came to the support of the company. They pointed to the Governor's pre-election pledge not to raise taxes. Higher taxes, the papers said, would do more than discourage one company. They would damage the state's ability to attract new industry. The tax issue raged as the major newspaper story in the state for months.

When the House Ways and Means Committee held a public hearing on the proposed tax, a Freeport official, armed with facts and figures, was present to air the company's case. Governor Long also appeared, said the Baton Rouge *State Times*, to "cajole, threaten, chide, admonish, and deride opponents of the measure and members of the House Committee." Under his urging the Committee reported the bill favorably.

While the House was preparing to act on the bill, Freeport renewed its efforts to defeat it. The company ran another state-wide advertisement quoting the comments of national publications on the tax. Reprints of the ad were sent to the 15,000 persons who had received the booklet. Company employees again took to the airwaves to explain, in French and English, what the tax would do to jobs and payrolls in the state.

Freeport next made a television film of its case, anticipating all the arguments for the tax that Governor Long might make. When he made the expected arguments, Freeport sprang the rebuttal.

The issue came to a vote in June. In a compromise effort the tax was reduced from $3 to $2.75 and then to $2, but it still failed to get the required two-thirds majority and was defeated.

The Governor Loses

Even that did not stop Governor Long. He proposed amending the state constitution to require a simple majority for tax legislation instead of two-thirds. Then he dropped that in favor of a plan to call a constitutional convention to rewrite the state constitution—principally to eliminate the two-thirds requirement for tax legislation.

The proposal to hold a constitutional convention was submitted to the voters in November, less than a year after they had swept Governor Long into office for his third term. But the Governor was more popular than his legislative brainchild. The voters rejected the convention scheme by a six to one majority.

In Connecticut, also, business men have succeeded in lowering taxes in the face of the determined opposition of the chief executive. The insurance industry in the state was taxed on premiums and annuity considerations from Connecticut business and also had to pay a tax on interest and dividend income from investments all over the country. Out-of-state companies were taxed only on premiums from their Connecticut business.

"The net result," says B. M. Anderson, vice president and counsel of the Connecticut General Life Insurance Company, "was that Connecticut insurance companies were among the highest, if not the highest, taxed in the whole country."

Sliding Reduction

The industry proposed that the tax rate be reduced gradually so that the state would receive at least as much in total insurance taxes each year as it did the year before. The reduction program began in 1944 and was renewed periodically until 1955, when it failed to pass the legislature. When the program again came up for renewal last year Governor Abraham Ribicoff attacked it as "one of the rawest give-away programs in the history of our state."

The facts presented by the industry to the state legislature painted a different picture. They showed that insurance taxes had steadily increased and more than doubled since the rate reduction began in 1944, and that future taxes would, according to estimates, continue to increase

continued on page 149

PRODUCT TESTING:
EVERYBODY'S DOING IT

MELVIN MANDELL, *Industrial Editor*

Chances are your competitors—and your customers—are going in for more intensive product testing. To protect markets and avoid possible damaging lawsuits, maybe your company should get on the bandwagon, too.

100 PER CENT TESTING: Although they are no bigger than matchheads, each of these silicone diodes is electronically tested at Hughes Aircraft Company in Culver City, Calif. The semi-conductor devices are packaged in railroad-tie fashion on the belts for quick mounting on assembling machinery.

AMERICAN INDUSTRY is going in for testing in a big way. Ever since World War II, when many manufacturers were obliged to conform to detailed and comprehensive Government test specifications, companies have been off on a testing binge. And it's all to the good. Unusual field conditions, the competitive one-year redesign cycle, and the greater need for reliability (in products ranging from missiles to home appliances) make careful product testing more necessary than ever.

Here are some of the new factors that are forcing industry to pay more attention to meaningful testing:

- The consumer, both in the home and in the factory, demands and expects evidence of product testing. The shortage of good servicing people to cope with complicated gadgets is intensifying this demand.
- Unmanned military vehicles (with safety factors sharply reduced to save weight) must be reliable—there's no human driver around to correct for errors. Parts must be carefully tested to insure reliability.
- Industry is now investing enormous amounts of capital in production machinery and office equipment. It can't afford downtime on huge production machines or giant data-processing computers. Hence the extensive testing, usually of production runs.
- New destructive forces such as nuclear radiation, ozone, and acoustic vibration have been discovered or are now more fully understood. Tests to determine whether products can resist these new forces must be developed. And when man invades space, still other destructive forces will undoubtedly call for new product tests.
- Some giant retailers have established or are establishing testing labs to check the goods they sell. Examples are Sears Roebuck, Montgomery Ward, J. C. Penney, and R. H. Macy.
- Public utilities, as, for instance, in Philadelphia, are testing home appliances for safety.
- Both industry and the public have become more aware of testing as the result of a wave of accidental deaths directly traceable to poor product testing or bad design that could have been corrected by proper testing. The electrocution of a two-year-old baby by a TV set was one example.

Yet despite all the talk about testing, some manufacturers still don't bother with it, either because they are ignorant of test procedures or because they don't appreciate the need and the potential benefits.

Fortunately, to meet the demand for better and more intensive testing, the whole art of testing is advancing. Older techniques, such as nondestructive, accelerated-life, and simulated-environmental testing, are keeping step with the march of technology, and techniques are being developed to cope with newly discovered destructive forces, such as stress corrosion.

Accelerated Life Tests

At the ever-increasing pace of product development today, accelerated life tests are becoming more and more significant. Manufacturers no longer have several years for thorough field-testing of prototypes. Often, if the new product isn't marketed quickly, it will be obsolete be-

fore it has a chance to get started.

Fortunately, the well-known techniques of accelerated life testing are improving steadily. For example, five years ago it took 144 hours of testing to judge whether a coat of paint would last one year. Today, this test takes only eight hours, with a comparable drop in test costs.

Many Kinds of Tests

Sample testing to destruction is accepted procedure on mass-produced goods. But when the product is a huge, one-of-a-kind piece of equipment, testing to destruction is out of the question. The solution is one of the many nondestructive tests, like the use of plastic models and stress-coating to reveal undesirable stresses, X-rays and ultrasonics to detect sub-surface faults, and ultraviolet and magnetic dust techniques to reveal surface weaknesses.

Extremes of temperature are the most common environments duplicated in the laboratory. But other field conditions reproduced under control are: high altitude, salt spray, high humidity, fungus, dust, shock, thermal shock, thermal cycling, acceleration, wear, mechanical and acoustic vibration, nuclear bombardment, and combinations of all these. The costs of simulation run from a few hundred dollars for a one-cubic-foot "cold box" to millions for a nuclear materials testing reactor or the huge new environmental chamber installed by Douglas Aircraft.

As field conditions become more strenuous, we uncover destructive forces that, in some cases, were never known before. For example, back in 1952, when the engines on the prototype B-52 were run up to full power for the first time, mysterious cracks appeared in wings and tail surfaces in about fifteen minutes. Boeing engineers soon found that the intense noise produced by the jets was the destructive force. Since that time the destructive power of intense sound waves has been well established. The acoustic vibration (which is completely unrelated to mechanical vibration) not only weakens structures but also causes electronic equipment to go haywire. To test materials, structural parts, and equipment for their ability to resist acoustic vibration, every aircraft manufacturer and many electronics companies have constructed ingenious noise makers supplemented by elaborate instrumentation. The largest and loudest "noise rooms" run up to hundreds of thousands of dollars.

The Space Age will make even greater testing demands on airframe makers. They will have to duplicate forces and environments that we can't even imagine now. However, the versatility of test facilities seems to be keeping up with the technological race. The minimum speed—32,400 mph—needed to escape from the earth's gravitational field was recently achieved, for one-tenth of a second, at the Air Force's test-center wind tunnel in Tullahoma, Tenn.

Because of its traditional concern with reliability, the aircraft industry has long been devoted to extensive and expensive testing. Other industries often copy its methods. But some of the test facilities are so costly that no one company can afford them. In these cases, cooperative facilities, like the giant wind tunnel at California Tech, are sometimes built. This cooperative approach to expensive facilities could be the answer for other industries.

Establishing a Test Department

If you don't have a test department, or if you want to reorganize the one you have, you should first hire a competent, experienced, and well-trained test engineer to run your lab. An upgraded technician or a cast-off design engineer won't do.

In fact, test engineers, a practical and detail-conscious breed, are becoming a separate branch of engineering. Recently, one special group organized its own national professional society, called the Institute of Environmental Engineers.

Right now is a good time to hire test engineers. When the first effects of the current recession were felt last Summer, companies began to let marginal engineers go. But since December, a lot of top-notch test engineers have been out of jobs, according to Allen L. Brassell, president of U.S. Testing Company.

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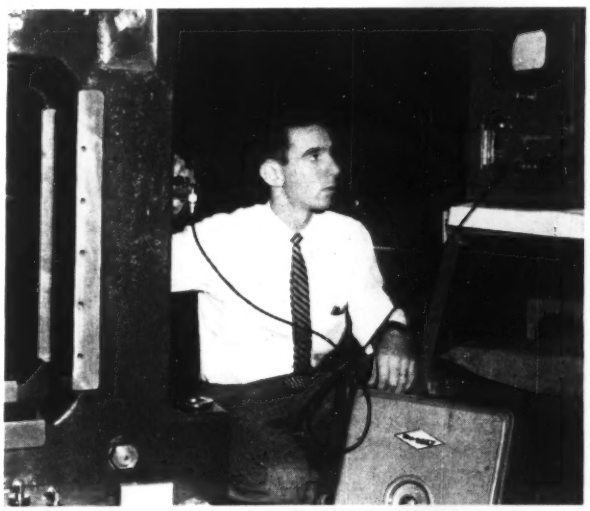


NONDESTRUCTIVE: For large, expensive machines like this Stanat foil rolling mill in Westbury, N.Y., nondestructive testing by magnetic, X-ray, ultraviolet, or ultrasonic techniques is essential. This Sperry ultrasonic unit seeks sub-surface defects.

ENVIRONMENTAL TESTS: A wide variety of rugged climatic or corrosive environments can now be duplicated in the test laboratory. Above, technician performs a flexibility test on rubber at –70° F in the cold chamber at U.S. Testing Company, Hoboken, N.J.

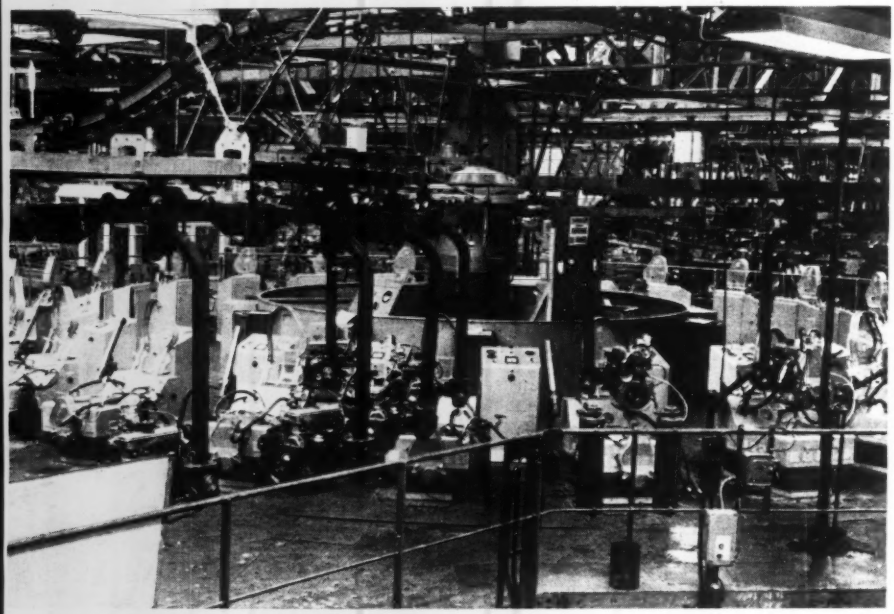
Small companies are at a disadvantage in setting up test labs, because it is no longer possible to hire a single jack-of-all-trades to handle all technical problems. Each technical specialty is growing in complexity. Now industry needs teams of test engineers who know how to use costly, specialized devices and supervise tests that cross scientific and technical boundaries.

At a certain point, however, the big company loses the advantage of bigness in setting up a lab. When one of the nation's largest appliance manufacturers built a complex of plants making a number of different products, a central testing lab was constructed. In a short time, the company discovered that the problems of scheduling all the diverse products of the area at one lab were overwhelming. It took longer and longer to get products tested. The solution was to construct a test lab for each division. The decentralized labs seem wasteful of men and materials, but they were the only way to insure adequate and rapid testing.

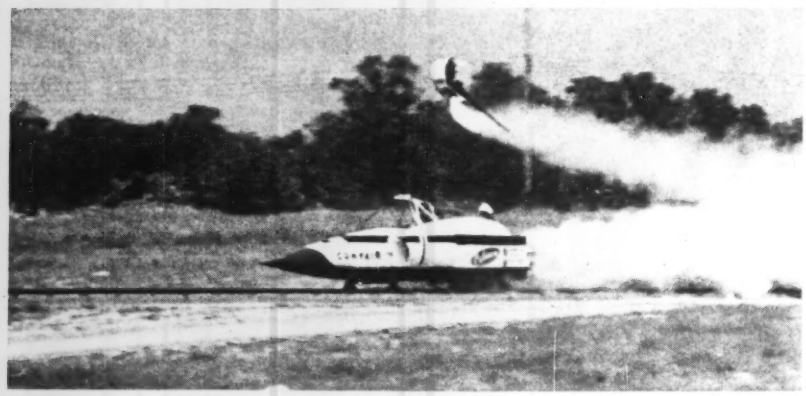
Although the director of a test laboratory must have the imagination and ingenuity to invent unusual test procedures and testing machines, it's helpful to know that there are several organizations in the country that also develop standard test procedures. In textiles, the American Association of Textile Chemists and Colorists in Lowell, Mass., is an excellent source. Consumers' Research in Washington, N.J., often supplies information on its test methods to manufacturers on request. Some of the procedures developed by the American Society for Testing Materials, Philadelphia, apply to end products, such as paint.

Many of the thousands of test specifications prepared by the Armed Forces apply to products that are essentially commercial equipment with a coat of khaki paint. These specs could be adapted for nonmilitary use. The many nonprofit and independent test labs are also sources of test procedures.

The National Bureau of Standards tests many end products for the Government, and the results used to be available to the public. But ever since the famous Astin affair in 1953, involving a very questionable battery additive, the NBS has adopted the politically expedient policy of keeping mum about its testing of consumer products.



MECHANIZED TESTING: During the twenty-minute revolution of this huge turntable, called "the Carousel," at the Renault plant in Billancourt, France, each engine is completely tested by a crew of technicians. Engines are then ready to move on to the assembling area.



SIMULATED TEST: To simulate ejection of a pilot and rocket-powered seat from a fighter, Convair runs this rocket-driven car, manned by a dummy pilot, down the Air Force's test track at Hurricane Mesa, Utah. Aircraft industry has long shown the way in full-scale testing.

Where to Report

If possible, a test lab manager should report directly to top management. If the test lab is under Production, there is always the possibility that the test manager will be pressured into approving a below-spec production run. If the lab is part of Engineering and Development, there is some risk that the test engineer will not adopt a sufficiently critical attitude toward new designs.

One danger that many test lab managers warn against is undue influence from the sales department. Under pressure from sales managers to provide something new each year, many companies hastily add new attachments or accessories to their products. These parts should be thoroughly tested by the company, even if the basic design of the product is not affected.

Having the test manager report directly to the higher echelons doesn't help, however, if the man he reports to isn't qualified to interpret the results or hasn't the time to study the report. Of course, for easy interpretation, the report should not be a bleak mass of statistics, but should be related to the market. For example, merely listing all leakage cur-

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Red-hot, razzle-dazzle, go-get-'em sales supervision has chalked up plenty of sales records in its day—and it's still going strong. But some companies are looking for other ways to motivate their salesmen.

SALES SUPERVISION: *Time for a Change?*

HAROLD J. LEAVITT

FOR THE PAST twenty years or so, color and showmanship have been fading fast from the U.S. business scene. By and large, management has been getting quieter, smoother, and more professional all the time.

In contrast, sales management still stands outlined in neon, dressed in tinsel, heralded by jazz. Industry's foremen are increasingly chosen for technical competence and ability to fit in with the rest of the supervisory group, but salesmen are still often selected for "personality" and "drive." Salesmen still get "sizzle" training programs, aimed at making them "powerful" personalities, but production and office personnel are now likely to be taught about conference membership or organization structure.

The same contrast shows up all down the line—"hot," individualized, inspirational supervision for the sales group and relatively "cool," cooperation-oriented, and even technical supervision elsewhere.

But sales supervision is undergoing changes too. It is by no means all hot and inspirational. In fact, in many cases it is not at all clear just what policy line a particular sales manager is pursuing. He may be pushing a big, inspirational sales rally and, at the same time, be running a "discussion group" or trying to act like a counselor to his employees.

This uncertainty in sales supervision raises some questions:

- Is hot, jazzed-up sales supervision functional? That is, does it help salesmen sell?
- Should it be modified toward "modern" management methods? Or does the situation call for all-or-nothing change?
- If hot supervision ought to change, what should it change into?

Remarks about the "jazz" of salesmanship, the ethics of selling, and what might be called the show-business side of sales management can easily raise the hackles of sales managers, especially if the comments are made by nonsalesmen. Sales managers are apt to assume immediately that such remarks are made by people who regard "salesmanship" as a bad word. But this very touchiness about being considered high-pressure or fast-talking suggests that sales managers themselves may in fact be questioning the usefulness, the up-to-dateness, and the respectability of jazzed-up salesmanship.

BAGGING YOUR PROSPECT: "In selling you've got to point the rifle, aim it, and pull the trigger." That was the theme of this sales meeting. The skit shown here dramatized it.

Jazz presumably serves a purpose. But what purpose? Why has the selling end of the business usually been flamboyant and inspirational? We can immediately discount one answer—that it is just traditional and serves no present purpose.

To explore some other possibilities, I informally polled a number of people in and around selling about one specific phase of sales management—the sales meeting. Why, I asked them, is the typical sales meeting so different from the typical meeting of accountants? Why are sales meetings likely to include more speeches, more hoopla and trick gadgets, more pretty girls, and more fist banging?

Answers fell into four main, but overlapping, groups:

- Some men argued that sales management uses trumpets and neon to simplify communication. The noise is just an "audiovisual aid" whose purpose is to dramatize, and thereby impress upon salesmen, the information management wants to get across—information about products, promotional campaigns, credit policy, and the rest.
- A second and more credible explanation contends that selling is an *individual* rather than a group job. Salesmen (the nonstore variety) tend to be geographically scattered. They are on their own and under only loose and distant supervision. Since the sales manager cannot literally look over the shoulders of his men while they work, he needs other mechanisms of control. One set of mechanisms is technical, like the system of sales quotas, territories, salesmen's evaluation sheets, and so on. But these technical controls can be applied only *after* the salesman has made his decisions. They help to pinpoint what has *not* been done or what has been badly done.

In contrast, the hot sales meeting and its accompaniments are *pre*-control mechanisms. Their function is to build the specter of the manager into the psyche of every salesman, so that a manager sitting in the home office is psychologically on the spot when a salesman calls on a customer. Hence the jazz.

Obviously, psyches cannot be *logically* intermingled. The process must be emotional. A salesman has to leave a sales meeting *feeling* the way the manager wants him to. He has to be inspired, because inspiration is a means of control—a guarantee that a salesman a hundred miles from headquarters will roll out of bed early and raring to go, like the salesman who once told me that he greets his wife at breakfast with, "Honey, I'm really gonna sell those razor blades today!"

- A third explanation is especially popular with old-timers: Salesmen aren't what they used to be. They've got no drive. They're too security-conscious. You need a big, noisy sales meeting to pep them up. The advocates of individual initiative back up this theory by pointing out the currently overwhelming proportion of salaried sales jobs, as compared to the commission selling of yesterday. When salesmen are more worried about pensions than current income, it's necessary to stimulate and inspire them, make them set their sights high, and generally stir up their entrepreneurial guts.
- Sales managers often say, too, that one of the main functions of the "revivalist" meeting is to boost a salesman's appreciation of himself. It is designed to give him a feeling of importance and respectability, by authoritatively telling him he *is* important and respectable.

The Psychological Reason

There is, however, another possible explanation of the function of hot sales supervision. It isn't particularly popular with salesmen and sales managers, but psychologically this hypothesis makes a good deal of sense:

A major purpose of the emotional jazz in sales meetings (and sales management generally) is to override, from a distance, feelings and attitudes that push salesmen away from selling. These are largely feelings of fear and doubt.

If salesmen need to be made to feel important—if they need to be given more "drive"—it may be because many Americans (including many sales managers) see the sales job as something to fear a little and to be a bit queasy about. And the heat generated in the sales meeting (and also by contests, give-aways, "sizzle" training, and the like) helps salesmen override their fears and doubts and barrel into the job.

There is considerable evidence to support the assumption that the selling job stirs up fear and doubt. Several surveys have hinted that the public doesn't want its sons to be salesmen—despite the fact that there is money in selling.

A second clue lies in the behavior of salesmen themselves. They hold rallies to prove to themselves that they are socially important. Many of them even deny that they are salesmen. They seem to "protest too much."

A third observation comes from

traveling with salesmen. Psychologically the salesman (*not* the in-store salesman, but the one who has to initiate relationships) holds the short end of the stick in his business relationships. He waits for the customer; the customer doesn't wait for him. He has to put his foot in other people's doors. He is the guest, never the host—but he isn't an invited guest. If he can get himself invited, then he has to persuade his host to buy, whether or not his host needs or wants to.

The salesman has reason to be afraid, personally as well as socially. He may have to battle his conscience in these new relationships with customers, and if not his conscience, then his ego. What young American likes the prospect of queuing up to see the buyer? Of *appealing* for the order? Of being always the defendant, never the judge?

It's Always the "Best"

Often salesmen say to staff people in their own companies, "Don't tell me anything bad about our product. Our product is the best there is. If I didn't believe in it, I couldn't sell it." I once jabbed at some sales managers with that quotation. They nodded agreement, but they couldn't explain how, by any objective standard, all competitive products could at the same time be "the best." Their only answer was the stubborn reiteration that a salesman who didn't believe in his product obviously couldn't sell it.

Once, when I was talking about these issues with a group of sales managers, one of them finally said, "I think I get what you mean. Like one time when I was selling books door to door. I went into a shabby house with no rugs on the floor and a bunch of kids with patched-up clothes. I closed a sale for about $200. But it bothered me a little. I kept thinking maybe they should have bought shoes instead of books."

Another sales manager immediately challenged him. "That's nonsense," he said. "My young salesmen always raise that point. It's obvious that that kind of family is precisely the one that needs the books. Books will help guarantee shoes and rugs for the next generation. I don't see what there is to feel bothered about."

To return to the question raised earlier: Does the heat generated by the hot sales meeting really work?

If the hypotheses about the individuality of selling and about fear and doubt are at all valid, then the answer is "yes." Hot sales management is highly functional, at least in its intent.

If the salesman does, in fact, find himself in a state of conflict, if he can't always easily decide between doing his job and maintaining his psychological safety, and if the supervisor is not on the spot to make up his mind for him, then hot sales management is there to help. It gives him a quick shot in the arm, building up the psychological forces on the get-out-and-sell side of the scale so that the opposing forces seem small and dim. It offers him emotional and often material support. It promises him praise, respectability, membership in a group, and a trip to Bermuda. It shows him, too, that everybody's doing it and that any fears he may have had about respectability are nonsense. So it helps him override (rather than dissipate) his doubt. In a way, the salesman under hot supervision is like a shy college freshman when a senior loads him up with a few drinks, slaps him on the back, and drags him down to Becky's place. Before he knows what's happening to him, it has happened. And if everybody's doing it, it must be respectable.

THE AUTHOR • An authority on industrial relations and former vice president and survey director of Nejelski & Company, New York, Harold J. Leavitt is now professor of industrial administration at Carnegie Institute of Technology. He has also served as consultant to the European Productivity Agency in Paris and is the author of many articles on industrial relations and other business problems. His latest work, *Managerial Psychology: An Introduction to Individuals, Groups, and Organizations*, will be published by the University of Chicago Press this Spring.

Is "Heat" Good Medicine?

If fear and doubt are the ills that sales management sets out to treat, it is still fair to ask whether "heat" is the best treatment. Psychologically speaking, "heat" does have several weaknesses.

Hot supervision, for instance, deals with a salesman's psychological conflict by building up one side and leaving the other essentially intact. It strengthens the wish to go out and fight, but it doesn't erase the fear and doubt. In effect, it deals with conflict by increasing rather than by reducing tension. It works a salesman up enough to get him into action, but it cannot guarantee that the action itself will be psychologically successful. A heated-up salesman may not behave as sensibly as he ordinarily would.

(Incidentally, the manager may not always want his salesmen to be rational. When the selling is of the one-shot variety, like some door-to-door selling, the manager may feel he would rather have salesmen sound like phonograph records, each giving his spiel without regard for customer differences.)

If this analysis of the heat treatment is valid, it follows that depression or letdown rather than elation should frequently follow a success-

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PRODUCT FEATURES ON PARADE: Here, a group of production employees march with placards like those used at political conventions, to play up the product selling points.

WORKERS JOIN THE WAR ON COMPETITION

ROBERT NEWCOMB AND MARG SAMMONS

Your employees can be your best allies in the battle to control costs and keep ahead of competition. Today, they're ready to listen to straight talk on hard economic realities—and pitch in on management's side.

In the eyes of the American workman, the word "competition" has suddenly taken on new meaning.

Until recently, competition has been the company president's worry. It has been the problem of the sales manager. Sometimes it has even been the supervisor's headache. But it has been no major concern of the employee. Now, things are different.

For the first time in years, what management has to say about competition, the need for quality, and the significant role of the customer, the importance of waste and scrap reduction is falling on receptive ears. The hard facts of layoffs, shorter workweeks, plant closings, and declining profits are inescapably there—and management is finally getting through to its employees.

In person and in print, executives are talking to employees with a newly appreciated sincerity. Management isn't saying, "We told you so." Rather, it's making a strong appeal, based on a new set of facts, for cooperation and understanding. Confronted by the sobering economic picture, employees are wondering whether management doesn't have a point.

The dehydrated economy and the turbulent competitive situation have brought several employee communication devices into fuller play. The employee publication, which naturally carries the largest share of the printed communications load, is undergoing an editorial face lifting. Newsletters to employees' homes are more numerous—and more to the point. Plant bulletin boards are no longer dusty repositories for last December's bowling scores, but display areas for frank messages about the state of the company business. Employee annual reports for 1957, now coming off the presses, candidly discuss the pressing problem of competition—and spell out precisely what employees can do to help.

The sharpened edge of competition has served to remind a number of top executives that the employee magazine's editorial page is a platform, not a pulpit. An analysis of presidential messages made two years ago showed that officials were dedicating themselves to such abstractions as freedom (in which all employees believe, anyway), careful driving, and the prevention of forest fires. Among professional communications people, the president's message was generally rated at the bottom in reader appeal.

Yet it has been clearly demonstrated in dozens of companies that when the chief executive uses his editorial in the employee paper to *inform*, readership runs extremely

high. Employees like straight talk.

In a survey a few years ago, the Peoples Gas Light & Coke Company in Chicago discovered that its executive messages were read with more interest and enthusiasm than anything else in the employee magazine. (The readership of the magazine was also encouragingly high.) The editors have wisely continued the two-page editorial feature in which Chairman Eskil I. Bjork reports company progress, policies, and problems.

In mid-1957, Railway Express Agency sampled readership reaction to its monthly journal and found that the straight-from-the-shoulder communiques of President Alfred L. Hammell attracted even more readers than the "personals" columns. Competition is a recurring topic in Hammell's articles.

These examples are symptomatic of the employees' desire to hear the news—good or bad—"straight from the horse's mouth."

In the monthly employee magazine at Pillsbury Mills in Minneapolis, President Paul S. Gerot writes a regular message called the "President's Press Conference." This is an informative, straightforward sharing of the facts with employees. When competition started boring in, Gerot called in three department heads to buttress his own editorial comments with statements on the competitive situation in manufacturing and sales. This outline of Pillsbury's competition was accompanied by a two-column box with one column devoted to explaining the situation and the other to the corrective strategy. In this way employees were given (a) the background of competition, (b) the existing situation, and (c) a guide to how they themselves could help.

Using Executive Interviews

The interview technique (or question-and-answer method) is a popular variant of the conventional presidential message. It lends sparkle to the physical presentation of the material, and the informality of the editorial style conceivably lowers the barrier—if one exists—between the front office and employee readers.

The executive vice president of American Welding & Manufacturing Company, Warren, Ohio, was recently interviewed by the employee paper editor. The subjects covered in the questioning are a cue to management's new candor in talking things over with employees: cutbacks, inventory reduction, compensation for loss of defense sales, competition, sales prospects, reasons for new equipment, new product development, major problems of 1958, and the company's long-range plans. A decade ago a company official would have run for cover with the popping of the first question.

Employee Participation

Appeals to employees to help dull the competitive edge sometimes suffer from serious shortcomings. Chief among these is a too-general approach to executive messages. Messages are often written from the viewpoint of management rather than from that of the employee. After reading a general invitation to consider the evils of competition, the employee still winds up wondering what he himself can do about it.

How can the employee be made to feel a part of the competitive picture? Reduction of waste and scrap and improvement of quality are the main ways in which he can be helpful. An employee has no voice in setting prices, no direct involvement with the competitive market, no influence on advertising. But he *can* help reduce waste and scrap. To this end, employee publications are being put to work to enlist employee support.

Some time ago, editors of Du Pont's plant papers tackled the waste theme by illustrating the everyday materials with which employees work and putting a price tag on the annual cost of each. Work gloves at one plant, for example, cost $31,604; paper towels, $4,518; electric lamps, $5,542; pencils, $792. The article suggested a four-point procedure for employees in helping to reduce waste, with the result that it declined substantially. The employees were appealed to sensibly, and once they understood the problem and their own relation to it, they cooperated in solving it.

Perfect Circle Corp. in Hagerstown, Ind., introduced its waste and scrap reduction drive with a double-page question-and-answer spread in an issue of the company magazine. The questions the company asked and answered are an excellent guide for any concern that wants to get the waste and scrap problem out in the open. The questions were: What is scrap? Why is it important to reduce scrap losses? How does the cost of scrap compare with other costs? At the current rate, what will scrap cost us this year? Can scrap losses be stopped? What can be done to help

CEREAL SWEEPSTAKES: Plant bulletin board at Pillsbury Mills displays rival products.

chronic scrap producers? What can every employee do to help?

Several years ago, Caterpillar Tractor Company at Peoria, Ill., pioneered in the dramatic presentation of the story of competition. Editors of the employee magazine visited the National Roadbuilders' Show in Chicago and arranged to have pictures of competitive equipment taken on the grounds. Back at the office, they dug out the specifications and prices of this competing equipment and spread the entire display over several pages in the magazine, to show employees what they were up against. The feature registered so solidly with employees that Caterpillar has since repeated the performance, up-dating specifications and costs.

The use of competitors' advertising in employee publications and on plant bulletin boards was once frowned upon by industry. Even today in many factories it is unheard of to mention a competitor by name.

Several companies, however, are more realistic. As one personnel vice president remarks, "You can't very well get employees aroused about competition if you don't tell them what the competition is." The Mead Corp., Chillicothe, Ohio, used two pages in its employee paper to identify all its competitors and to quote their claims under the heading WHAT OUR COMPETITORS ARE SAYING. Another Ohio concern, the Gardner Board & Carton Company, Middletown, showed specimens of competitive advertising, with the editorial comment: "You can see we have competition by just looking at these reproductions of advertisements . . . shown here are ads of direct competitors who try to sell to the same customers we do."

In discussing the gravity of the competitive picture, Pittsburgh Plate Glass Company remarks pointedly, "In this era of tough competition, increased costs can kick a prospective order right out of the window into our competitors' laps. Lost orders add up to production cutbacks and laid-off workers."

Plant Bulletin Boards

The communications war against competition—in plants where war has been declared—is continuous. "Competition is like safety," a personnel manager remarked. "You must talk it all the time, through every possible medium. If you don't talk it, employees lose their awareness of it. When they lose the awareness, the company loses the sale."

One way to talk competition all the time is with plant bulletin boards. They are rapidly gaining in popularity as the best plant-level device for getting across a message. The bulletin board can talk of today's events today, and the impact on the employee mind is made at the plant as well as at home. Bulletin boards, properly prepared, put over messages quickly.

At Harnischfeger Corp., Milwaukee, company-wide bulletin boards carry consistent messages on competition and the related theme, waste and scrap reduction, in a variety of ways. Here are some examples with headings in quotes:

"Our Competitors Are Making Our Jobs Tougher by the Day" (an on-the-job picture feature showing the problems salesmen face daily).

"Competition All Over the Lot" (a display of advertising showing products and performance data).

"Waste Means Money Down the Drain" (pictures of rejects).

"Our Scrap Is Showing" (reproductions of departmental charts showing the monthly scrap standings).

The competition theme, of course, is generally interwoven with themes of quality and customer-mindedness. Here again progressive managements have moved from the general to the specific. They don't refer simply to "the customer"—they tell who he is, what he makes, where he's located, what kind of company products he uses. Many manufacturers are using their bulletin boards to identify their customers and bring the end-product use closer to the employee, thereby heightening his own quality consciousness. At the East Chicago, Ind., plant of Combustion Engineering, Inc., bulletin boards carry not only job numbers but the names of customers for whom the jobs are being done.

Newsletters to employees' homes—a medium that has grown enormously in the past year—are considered excellent devices for conveying the story of competition. By means of the newsletter, which is written in an informal, almost conversational style, the company can "talk shop" with employees and their families. Because it can be produced internally, often overnight, the newsletter gives the reader a sense of immediacy. And the cost is low.

Competition is a recurring theme in these letters, because it is related to the employees' own job security. The more candid newsletter compilers are not reluctant to point this out, but the majority seek to build a spirit of company-employee teamwork at the home level without emphasizing the threat to jobs.

Although the great majority of newsletters are issued on either a monthly or a once-in-a-while basis, there has been a recent shift to biweeklies and weeklies. At least three companies are issuing dailies with considerable success. Johns-Manville, Waukegan, Ill., for instance, publishes a daily with highlights of

continued on page 160

KNOW YOUR COMPETITION: To keep employees on their toes, this paper displays competitive trademarks.

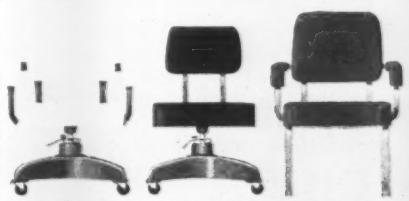
A big, new executive posture chair value from COSCO®

● Compare this big, comfortable, fully-adjustable Cosco executive posture chair with others costing much more. You'll find it has everything! Cosco de luxe features include dual-contour molded foam rubber seat; foam-cushioned backrest, upholstered front and back; foam-cushioned armrests; quiet, long-wearing nylon bearings . . . *six comfort adjustments*. It's an imposing chair, enormously comfortable. And it's a greater value because all parts, except casters, are manufactured by Cosco, permitting precise quality control and greater economy for you. A free demonstration will prove that this solid Cosco chair is a solid value *for you*. Call your Cosco dealer now! *You'll find him listed under Office Furniture in yellow pages of phone book . . . or write for free color catalog.*

*Price on D-Plast Custom Colors, Style 5-83. Other fabrics slightly higher. Zone 2: Texas & 11 western states.

HAMILTON MANUFACTURING CORPORATION, Dept. DR-48, COLUMBUS, INDIANA

Pictured above: Model 28-STA Executive Posture Chair $67.95*
($71.95 in Zone 2)



Model 28-TA
Executive Chair
$59.95*
($63.95 in Zone 2)

Model 25-S
Secretarial Chair
$42.95*
($46.95 in Zone 2)

Model 27-LA
Conference Chair
$39.95*
($43.95 in Zone 2)

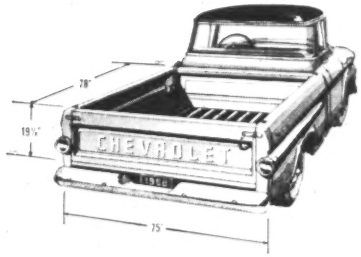
Just out! The newest in pickups!

NEW FLEETSIDE BY CHEVROLET

Here's the new sweetheart of the Task-Force fleet, Chevrolet's new Fleetside pickup! No truck has ever been better to look at . . . or better for your business.

Long, sweeping lines, graceful body contours . . . *new* truck appearance that's fleet, dashing and completely modern! Yet there's even more to the new Chevrolet Fleetside than the striking beauty that first meets your eye. There's *size*, for instance: extra room inside to pack many additional cubic feet of payload. And with double-walled lower side panels, durable hardwood floor, and solidly constructed full-width tailgate, the new Fleetside is the toughest of pickup bodies, too! A new adjustable latch keeps graintight tailgate free from rattles.

Here's a new high in hard-working utility, matched by new styling that makes you stand out on any street. See the new Fleetside at your Chevrolet dealer's now! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.



More load space than any other comparable low-priced pickup. In lengths of either 78 inches or 98* inches and a full six feet in width, this new body actually provides 50% more cubic capacity than the conventional pickup box! **Optional at extra cost.*

Plenty of work-whipping hustle and muscle. Your choice of two great engines—standard 145-h.p. Thriftmaster 6 or optional at extra cost 160-h.p. Trademaster V8. And truck-engineered chassis components will take all the abuse your most bruising hauls can give them!

CHEVROLET **CHEVROLET TASK · FORCE TRUCKS**

Heavy transformers swing aboard ship

MACHINERY— AMERICA'S KEY EXPORT

ALEXANDER O. STANLEY

With domestic markets for industrial equipment uncertain, exports could give your sales a welcome nudge upward. The rapid spread of market mergers abroad will open new overseas channels.

IF YOUR COMPANY is in the business of producing industrial machinery or components, almost any kind, it may dispel some of the recession gloom to take a look at what's been going on in our overseas markets. In fact, it may suggest a way to give your sales curve a boost. In fact, if your company's products are sold to concerns that manufacture industrial supplies or equipment of any type, it's likely that your profit levels are affected in one way or another by sales in this vital area. What's happening to our industrial exports may, in fact, concern you more directly than you guess.

Advance tabulations of U.S. exports for 1957 reveal that industrial capital equipment sales (transportation, office, agricultural, and household equipment excluded) advanced 15.6 per cent over 1956 levels to tally $2.744 billion by year-end. During this same period, our total export sales gained 11.5 per cent. Here are some of the statistical highlights:

- Out of the 26 broad groups of industrial exports reviewed here (table, page 52), only four declined—mildly—in 1957.
- The 26 broad groups considered here cover 291 specific categories of industrial machinery and equipment. Of these 291 categories, slightly more than one in every four (84 categories or 28 per cent) dropped below 1956 export levels. But more than one in every three (107 categories or 36 per cent) reflected gains of, or considerably more than, 20 per cent over 1956 sales.
- If all categories of durable-item exports are tallied, including transportation, office, agricultural, and household equipment, it will be found that this whole group, plus the materials needed to feed, run, and repair the equipment, accounts for $4.50 of every $10 racked up in all U.S. export sales. And total export sales came to $19.3 billion in 1957, proving that today's export business is big business.
- While no numerical statistics are available, there is mounting evidence that more and more U.S. companies, especially in the industrial area, are joining the sales rush to overseas shores. Item: The net direct capital outflow abroad was some $3 billion in 1957.

Exports Made a Difference

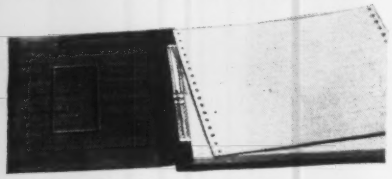
The desire to open more profitable channels of trade or to penetrate markets abroad with new products has led management to give overseas programs high priority. For example, the Rheem Manufacturing Company of New York, maker of furnaces, steel drums, water heaters, and a wide line of other products, had its back to the wall in 1956. A loss of $16 million before, $9 million after, tax credits compelled a management change. Under the export-minded guidance of its new president, A. Lightfoot Walker, the company made a fast comeback. Overseas sales of $34 million accounted for 18 per cent of the $188 million volume in 1957. Today Rheem has eighteen associated and licensed manufacturing plants in twelve countries (besides its seventeen U.S. plants), operating in South America, Canada, England, Italy, the Philippines, Singapore, Spain, and Sweden.

To a smaller but still impressive degree, Fischer & Porter Company of Hatboro, Pa., has boosted its export sales. The company produces electronic components and equipment, including complete process instrumentation, data reduction, and automation systems, as well as chlorination equipment and industrial glass products. Its aggressive young management decided there was a lively market for its equipment abroad. Following a program of direct export sales, licensing agreements, and even the installation of branch plants in Canada, England, the Netherlands, France, Germany, and Australia, Fischer & Porter built up a solid and profitable business

If You Use Modern Business Machines—

Many office machines use marginal prepunched forms. And the records you make with this modern efficiency system are valuable. How do you file them?

The best way is to bind them in Acco Pin Prong Binders equipped with special narrow prongs to accommodate the small holes in the record sheets. Your records



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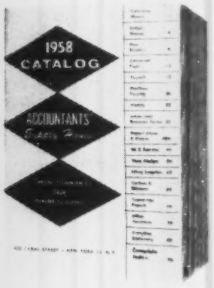

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A GOOD YEAR FOR INDUSTRIAL EXPORTS

This table covers U.S. exports of industrial machinery, equipment, apparatus, and parts. The 291 export categories are broken down by broad industry and product groups.

Breakdown of Overseas Purchasers (by industry) (*Figures in parentheses designate number of product categories included in each group.*)	U.S. Exports (*in millions of $*) 1957	1956
Mining industry (20)	$214.1	$206.1
Petroleum industry (3)	72.3	64.0
Food and beverages industry (16)	85.9	78.3
Textile industry (20)	117.8	112.8
Shoe and leather industry (2)	4.1	4.4
Rubber industry (2)	20.0	19.1
Chemical industry (1)	10.0	10.4
Ceramics, glass, and plastics industry (7)	41.1	34.3
Printing industry (6)	39.9	39.0
Paper and packaging industry (5)	72.1	52.5
Lumber and woodworking industry (5)	23.1	27.1
Construction industry (25)	555.9	476.2
Air-conditioning (industrial & commercial) (13)	59.8	47.0
Electronics industry (2)	27.6	29.0
Communications industry (5)	74.7	60.7
Metal-working (tools, apparatus, parts) (4)	20.3	18.1
ALL INDUSTRY		
Testing, measuring, and recording instruments (9)	95.8	75.4
Power-generating and transmitting industry (30)	221.0	191.8
Heat-generating equipment and accessories (9)	85.3	64.2
Pumps, blowers, compressors, and parts (18)	159.1	141.2
Machine tools, equipment, and parts (38)	304.7	235.1
Original equipment (21)	251.9	229.5
Metal-molding and -casting machines (4)	11.6	8.9
Mixing and blending machines (3)	44.6	30.1
Materials-handling equipment and industrial trucks (16)	83.6	76.5
Machinery and equipment for service industries and all others not elsewhere specified (7)	48.5	42.2
TOTALS	$2,744.8	$2,373.9

abroad. It now runs to better than $14 million annually.

Many other U.S. companies have also decided it was common sense to look for a global market for their products.

More Than Meets the Eye

Actually it's reasonable to assume that thousands of U.S. companies are involved directly or indirectly in the business of selling their products abroad. Aside from concerns that produce the finished equipment, there are many others that manufacture components for machinery and equipment sold overseas. Another large and uncounted group doesn't even realize that its products are being bought domestically for end-delivery abroad by export brokers, resident buying officers, and even other manufacturers for whom it in effect subcontracts.

How big is our stake in all this? Take a look at these eye-opening statistics released by the U.S. Department of Commerce, Balance of Payments Division of the Office of Business Economics in the January 1958 issue of *Survey of Current Business*. These show the percentages of domestic production (by dollar volume or quantity) moving to overseas markets during the first nine months of 1957:

	Total Domestic Production	% of Net Exports*
Electrical machinery	$15.8 billion	4.0
Other machinery	$22.4 billion	14.6
Trucks, tractors	24,600 units	80.9
Machine tools, forming and shaping machinery	$930 million	17.8
Aircraft, civil	5,100 units	42.9
Locomotives	1,500 units	50.5
Railway passenger cars	412 units	43.6
Trucks and buses	824,000 units	23.3

*Exports less imports unless imports negligible

Here are some excerpts from this study that highlight the impact of exports on our capital goods sales:

The even more rapid rise in exports than in domestic sales of nonelectrical machinery was particularly outstanding in view of the record expansion in domestic investment spending during the past three years. The ratio of export to domestic sales of such machinery, having climbed slowly but steadily since 1953, reached an alltime high of almost 15 per cent in the third quarter of 1957.

All in all, exports were important in influencing output schedules of many of the nation's top-ranking industries. Notwithstanding the major gains in domestic demands—especially since 1954—export outlets for numerous key individual products have grown at an even faster rate than domestic markets.

The common estimate that about 4.5 million people in the U.S. get direct or indirect employment from

continued on page 56

"They can't do this to me ever again!"

"That's what I told myself the last time they raided the Accounting Department, and had half my high-priced staff stuffing envelopes a whole afternoon! . . . I decided, as comptroller of this company, our mailroom needed a PB Mail Inserting Machine. Now there's no longer any reason for disrupting my department—and we've also cut our mailing costs considerably."

PB's new "3100" Mail Inserting Machine is a major convenience for mailings of a few hundred or few thousand—and a major economy for all large mailings. It gathers, nests, and stuffs in envelopes as many as four varied enclosures . . . closes, seals and stacks—as fast as eight trained workers! Saves up to $7 per thousand pieces, permits better scheduled mailings and more mailings to promote your product or service. An optional postage meter machine provides preferred metered mail postage—or alternative postage. Call the nearest Pitney-Bowes office for details. Or send for free illustrated booklet and user case studies.

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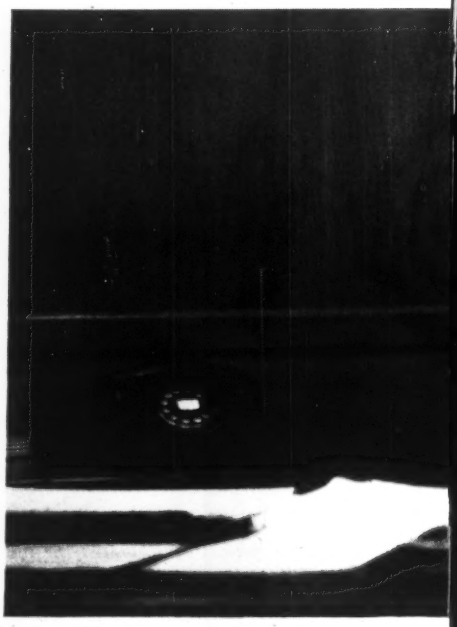
IBM MANAGEMENT INTERVIEW



Q. *Do computers pay off?*

A. *Our new IBM Ramac pays off in inventory savings alone.*

Paul H. Quick,
President,
Kingsboro Mills, Inc.,
Chattanooga, Tenn.

ELECTRONICS WITH A FLAIR FOR FASHION

THE Rogers LINGERIE STORY

When you deal with a list of 7,000 retail outlets . . . carry a short-lived, yet complex, high-fashion inventory . . . pack the major share of your business into two hectic periods of the year. . . how can you get the jump on competition?

Kingsboro Mills, Inc., maker of famous Rogers Lingerie, answered that question . . . blasted those problems . . . when they became the first manufacturer in the soft-goods industry to install the IBM 305 Ramac®.

Having tested this new data processing system with its fabulous five-million character memory in the heat of a record-breaking selling season, Paul H. Quick, President of Kingsboro Mills, Inc., and Richard H. Houck, Vice President and Treasurer report here on the progress and profits possible through an integrated data processing program.

Q. With an exceptionally successful business such as yours, why did you feel the need for electronics?

Mr. Houck: Well, we'd had a taste of what IBM could do for us with punched cards—reducing the processing of orders from ten days to three, for instance. When Ramac came along with the means of cutting those time lags in half, or even better in some cases, we knew from experience what those time savings could mean to us.

Q. Then what would you say was the main reason for installing Ramac?

Mr. Quick: One big reason—service to our customers.

Q. How has Ramac helped you improve your service to customers?

Mr. Quick: At one time, during our seasonal peaks we were literally swamped in processing orders. Mr. Houck was being generous when he said before that our lag was sometimes ten days. I've known it to be as much as two and a half weeks. Punched cards cut that lag to three days. Now, with Ramac, orders received today are in our shipping department tomorrow.

"Automatic credit check is another management control that Ramac gives us." Richard H. Houck, Vice Pres. and Treasurer.

Q. What else does Ramac do for you?

Mr. Houck: The big thing for us is the wealth of information we get now that we didn't—or couldn't—get before. You might say that Ramac puts our management out in the field. With the new sales reports, market analyses and inventory

controls we get now, we know what's going on every minute, and can help our salesmen with positive directions.

Q. Then you consider Ramac a real sales help?

Mr. Houck: Actually . . . the right arm of our selling program. Some time back we inaugurated what we call our Never-Out Program. The idea was to keep the retailer constantly stocked with basic garments—those with not too much of a style factor. With our punched card system we could guarantee 48-hour service on a limited portion of our line. We used to do 37% of our total sales volume on that basis. Now we're doing 63% of our volume in Never-Out with Ramac because we can extend that 48-hour service into the high-fashion field and keep our customers stocked with a bigger variety of fast-selling items.

Q. Any actual cash savings you can point to?

Mr. Quick: Here's where this thing is really paying off. It's taken a tremendous figure out of obsolete merchandise sales—the inventory we used to have on hand at the end of a season. Our business has increased more than two and a half million dollars, and our distress sales are no higher than they were three years ago. When Ramac spots inventory mounting on any item, it calls it to our attention. We can stop production today, and prod our salesmen on it tomorrow.

Q. So percentage-wise you're way ahead?

Mr. Quick: Very definitely! Another thing . . . in spite of doing a lot more business, our general administrative expense was exactly the same this year as it was last, to the tenth of a percentage point. We have to give Ramac credit for that, too.

Q. Now, how about growth? How does Ramac fit into your growth plans?

"We get information on schedule now, and you'd be surprised how that eases your mind."

Mr. Quick: It's flexible enough to grow with us. We've already had occasion to prove that. In fact, we look to Ramac to speed our growth.

Q. Didn't this switch to Ramac involve some fairly major dislocations in your day-to-day operations?

Mr. Houck: Not at all! IBM showed us the way. But we're rather proud of the part our own organization played in the cut-over. One of our former machine operators, for example, went to an IBM school and developed into a first-class programmer. That's given us the chance to introduce a lot of our own ideas into our programming. But the big thing has been the service and experience IBM put at our disposal. That's something money can't buy.

IBM DATA PROCESSING

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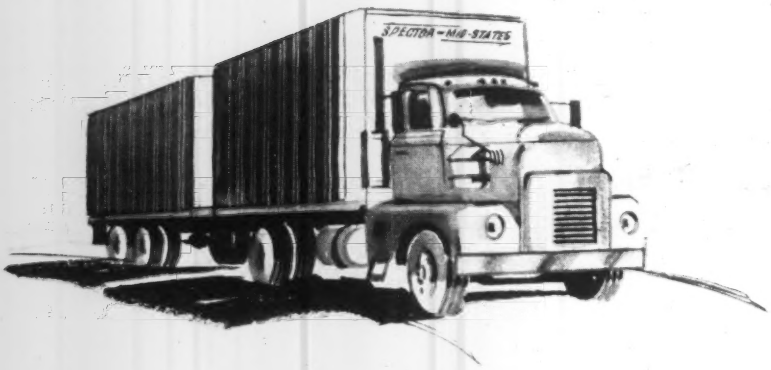

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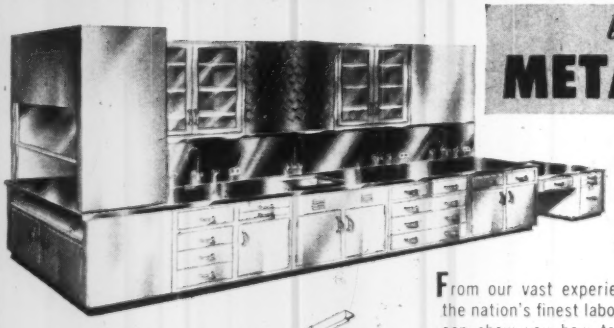

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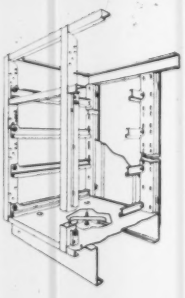

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our international trade is probably conservative. The depth to which exports penetrate—and provide profits and jobs—should also be considered. In this day of waxing unemployment and waning profits, our overseas prospects can be encouraging.

U.S. in Top Spot

How do we compare competitively? In 1956 (latest year for which complete annual figures are available), we held the No. 1 spot in exports of industrial and transportation equipment. More than $17 billion of capital goods were exported to all markets of the world by fifteen key countries. Our share (including special category shipments made under our military and foreign aid programs) was $6 billion, or more than one-third of the world total. The United Kingdom was No. 2 with $3.4 billion, closely followed by Germany with $2.9 billion. France was next with $797 million and then Japan with $483 million. The next ten countries are listed in declining order of industrial equipment export sales: Italy ($454 million), Sweden ($447 million), the Netherlands ($420 million), Switzerland ($385 million), Belgium ($362 million), Canada ($324 million), Denmark ($187 million), Austria ($112 million), Finland ($91 million), Norway ($86 million).

Data available for the first nine months of 1957 indicate that every one of these eleven leaders improved its sales position against the comparable period of 1956 (figures in millions of dollars):

	1957	1956
United States	$5,240	$4,987
United Kingdom	2,736	2,579
West Germany	2,556	2,143
France	721	587
Sweden	430	322
Japan (eight months)	413	287
Italy	404	321
Netherlands	331	313
Switzerland	313	278
Canada	283	252
Belgium	280	274

Source: United Nations Statistical Office, Trade and Transportation Section

What are the best markets for U.S. industrial goods? Oddly enough, some of our competitors are also among our best customers. For instance, Canada in 1956 topped our list of customers with purchases of $1.6 billion. Latin America as a bloc (seven countries reviewed) took the No. 2 position with a total of $1.2

billion. In this bloc, best customers stacked up this way: Mexico ($380 million), Venezuela ($303 million), Colombia ($153 million), Cuba ($136 million), Brazil ($127 million), Argentina ($81 million), and Chile ($75 million). Significantly, Latin America received the bulk of Export-Import Bank credits during fiscal 1957. It also got record amounts of U.S. direct capital investments last year.

As a bloc Europe (ten countries reporting) bought $700 million, much of it concentrated in France ($120 million), the United Kingdom ($116 million), and Belgium ($102 million). Germany, Italy, the Netherlands, Spain, Sweden, and Switzerland, in that order, operated in the $50 million to $75 million range. And the U.S.S.R. accounted for only $2 million worth of purchases.

Equipment Goes East

Fourth in sales importance was the Asia-Oceania group. Eleven selected markets bought slightly more than $500 million of "made in U.S.A." equipment. The best customers in this area were India, the Philippines, Japan, and Australia. These were in the $80 million to $95 million annual range. Indonesia accounted for $45 million. Picking up annual lots of $25 million or less were Pakistan, Thailand, New Zealand, Cambodia-Laos-Vietnam, and Malaya. Hong Kong trailed with $5 million.

In the troubled Middle East, five countries accounted for $184 million of industrial purchases, with Saudi Arabia, Iran, and Turkey in the $40 million annual range. Egypt bought $31 million worth; Iraq $24 million.

Trailing in sixth place was Africa. Here five enumerated countries imported $175 million. The best market was the Union of South Africa with $113 million, followed by the Belgian Congo with $35 million, Morocco and Tunisia with $18 million, and Rhodesia and Nyasaland with $9 million.

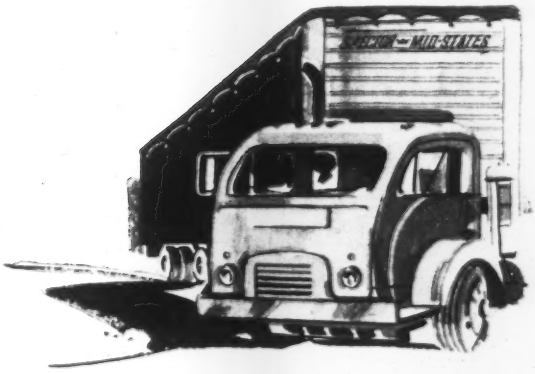
Over-all, the general trend of industrial exports was up during 1957.

But there is the other side of the coin to consider—particularly dollar exchange, which in effect controls the purchasing power of overseas industrialists.

Here are some of the "if" factors that will affect tomorrow's prospects.

- If our imports continue at or near present levels, and forecasts say they

SPECTOR MID-STATES



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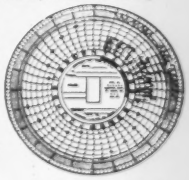
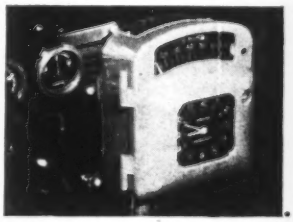


CHART TELLS ALL



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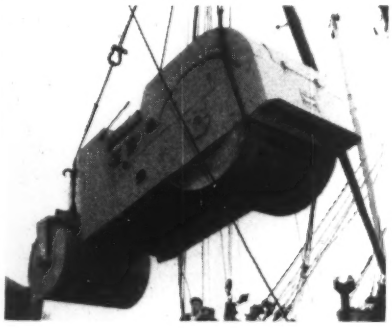

ROCK CRUSHER: A complete rock-crushing plant is being loaded on the *Ciudad de Colombia*. One component is shown here.

will, our prime customers abroad will continue to earn fairly adequate dollars to pay for their purchases here. If our imports sag, our customers' ability to buy will be hurt.

● If our overseas travel expenditures hold at or near last year's, they will provide an additional cushion of dollars—and some expect 1958 travel to set new records. It won't be surprising if business trips abroad appear on more travel expense vouchers in 1958.

New Opportunities

● If the European Common Market starts to make a dent in our exports—and $2.9 billion of our total exportables are vulnerable, 20 per cent of which are in industrial, electrical, and development machinery—direct sales may start to fall off. But the pressure will be tremendous on U.S. companies to retain their competitive position by establishing branch plants or by buying into or leasing existing European facilities. This suggests more, not less, exports of industrial capital equipment, parts, and material over the long pull—at least in those categories not available within the E.C.M.

● If the U.S. recession deepens, repercussions can be expected abroad. Rising unemployment, excessive inventories, cutbacks in production are already appearing on the scene in Europe, although in some cases they stem from efforts to avert intensified inflationary pressures by tightening credit and curtailing investment. While the world index of industrial production stood at a record 116 (1953 = 100) in the third quarter of 1957, the figures showed a seasonal drop of about 3 per cent in mining and manufacturing output. Deepest decline was in Europe (7 per cent).

North America dropped 2 per cent, but Latin America increased output by 2 per cent. Every industrial group except food, beverages, tobacco product manufactures, and nonmetallic mineral products showed a decline between the second and third quarters.

• If the Reciprocal Trade Agreements Act, due to expire June 30, or some adequate substitute, is not passed, we can expect a serious dislocation of our world trade, in addition to the political and military repercussions. Any withdrawal from a liberal trade policy will bring a rash of tough foreign governmental restrictions on import of our products.

More Credits Abroad

• If the Export-Import Bank of Washington is granted the $2 billion boost in lending funds it wants (the ceiling is now $5 billion), more U.S. capital equipment and supplies will float abroad on its loans. Right now something like $625 million is committed in credits for the first six months of 1958. A substantial portion involves machinery and equipment. And export credits are expected to rise in the second half of 1958, especially if additional funds are voted.

• If the marginal and underdeveloped countries of the world continue to press for and receive industrial injections into their economies, whether financed by loans, grants, or capital from private industry, the investment climate abroad will continue to improve—and so will our capital equipment sales. These small markets may hold big opportunities for many exporters in the immediate future.

But whatever the short-term outlook, you can be sure that every dollar's worth of industrial equipment sold yesterday, today, and tomorrow means additional dollar sales in the future—not only in materials but also in replacements and repairs—for machines wear out or become obsolescent. And each new machinery installation sets up another potential sale for the future.

NOTE: A special supplement to this article, detailing the best and worst 1957 export sales showings in the 26 broad categories of industrial machinery and equipment tabulated on page 52, is available on request to *International Markets*, DUN'S REVIEW AND MODERN INDUSTRY, 99 Church Street, New York 8, N.Y.

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You select the community you want. You specify plant construction details or choose one of several plant "shells" now being readied for completion.

IMPROVED "TAX CLIMATE"

Pennsylvania recently took major steps to create a new "tax climate" favorable to new and established industries. The following basic tax changes were enacted in 1957:

Manufacturers were exempted from capital stock and franchise taxes;

Machinery and equipment taxes were eliminated, state-wide;

Tax on stock transfers was repealed;

Temporary 3% sales tax was made permanent;

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Industrial representatives are also available to you for personal inspection tours and consultations concerning your plant location needs. *All inquiries are confidential!*

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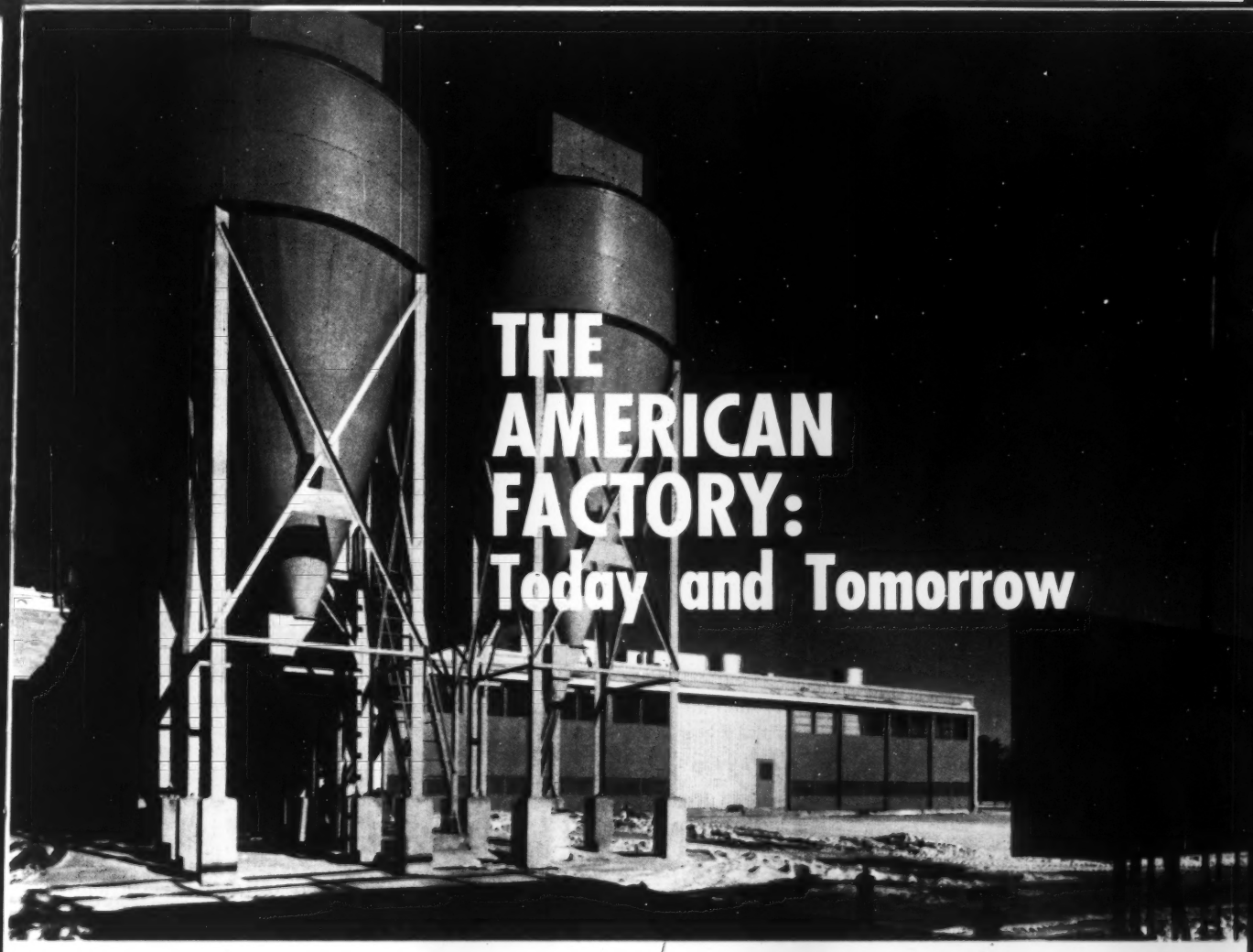

THE AMERICAN FACTORY: Today and Tomorrow

AN EXTRA EMPHASIS FEATURE

prepared under the direction of CARL HEYEL

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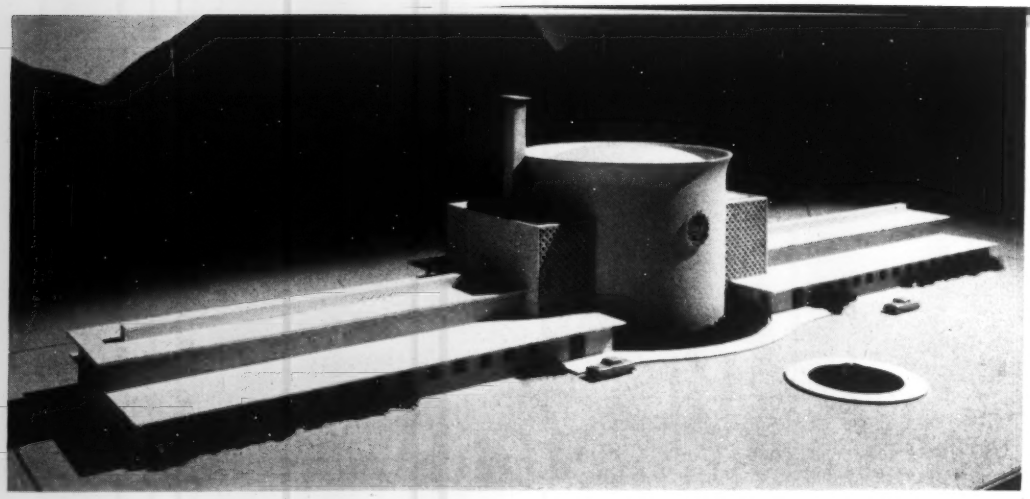


FACTORIES FOR TOMORROW

SALES UP, NET OFF

EARNINGS OFF SHARPLY, DESPITE RISE IN NET SALES

EARNINGS BELOW LAST YEAR— HIGHER EXPENSES BLAMED FOR DROP

DO THESE HEADLINES tell the story of your company's year-end or quarter-end position? If so—or if your break-even point is taking a disturbing upward turn—this DR&MI report on today's and *tomorrow's* new plants, with the opportunities they offer for more efficient operation, will be of special concern to you.

Increasing labor costs and creeping inflation continue to squeeze profit margins in all industries. In surveys made at the close of last year by DUN & BRADSTREET, INC. (DR&MI, March 1958, page 21) and by the National Association of Manufacturers, almost every company expecting to hold or raise current profit levels in the year ahead reported the need for added sales to counteract thinner spreads.

Obviously, any individual business lives or dies on the strength of its profit margin. To keep its head above water, management must have a healthy margin for advertising, selling activity, and the "seed corn" of research and development—requirements that increase the pressure for maximum economy and flexibility in operations. All this adds up to the need for up-to-date facilities, capable of producing at the lowest cost and strategically placed to expedite procurement and service to customers.

Of course, orderly planning for continuing growth and service must always be part of management philosophy. And new-plant planning is not tied up only with pressing and relatively recent problems of profit margins. Many plants being readied for opening today, or now on the architect's boards or in engineer's prints, are not "crisis children" but necessary steps in the conduct of any well-managed enterprise. New markets, new products, new organizational moves for decentralization or expansion—all spur interest in up-to-date methods and practices of plant location and innovations in design and construction.

A Challenge to Management

What is management doing, and what can it do, about its facilities problem? To get answers, DR&MI inquired into hundreds of experiences and opinions. In addition, a broad cross-section of 1,500 large- and medium-size manufacturing companies was surveyed by mail. Responses were discussed in detail with executives, architects, engineers, and operating men during plant visits and round-table meetings throughout the country.

As was expected, management approaches to the facilities problem differed widely, even among successful companies of comparable size in the same industry. But despite differences, a pattern for basic decision making does emerge. We report it in detail on page 64. Here are some highlights of needs and trends.

Needed: Imagination

Those who provide professional help for facilities programs were insistent that management thinking ought to be more imaginative than it usually is. Typical comments:

- "In my tri-state area, out of the hundred new plants with which I was personally concerned by virtue of the industrial equipment we supply, a good 75 per cent have proved inadequate within two years after completion."
- "We're building the third section of a plant, and our client still doesn't know what product he's going to make there. He started out without a definite program. As a result, he keeps making costly changes because he apparently hadn't determined his objectives in the beginning."

Many small companies find it difficult to set aside reserves under present tax provisions, or else lack the foresight to retain earnings even when they can. As a result, many of

these companies will have to go out of business when they can no longer produce efficiently. Lacking reserves, they cannot afford to bring their plants up to date, and they are not in a position to get public financing.

To survive, the small company must watch technological developments and maintain a realistic take-out policy.

Over-Capacity and "Bargains"

Securities and Exchange Commission and Department of Commerce figures show that plant and equipment spending hit a peak in the third quarter of last year. Now, with the current recession, production may drop further behind capacity, and a considerable slide-off in new plant construction for 1958 is expected. Changes, of course, vary widely from industry to industry.

"What does this mean in terms of a business man's decisions about his own expansion?" DR&MI asked. "Why think about building if there is plenty of available capacity?"

The answer is that over the next twenty years the economy will continue to expand. For the individual company, that means its management must set aside substantial portions of profit, supplemented by new funds, for newer, more efficient plants. The well-managed company thinks of new plants as profit insurance against periods of lower sales. Lack of such insurance may spell disaster for the marginal operator and is risky business for almost any manufacturer.

Gillette Company's vice president, Howard Gambrill, Jr., underscored this point when he said, "At our 1929 rate of productivity per employee, we would now have 100,000 employees—and payroll obligations which would lead us to bankruptcy. Actually, because of more efficient production processes, we now have 10,000 employees."

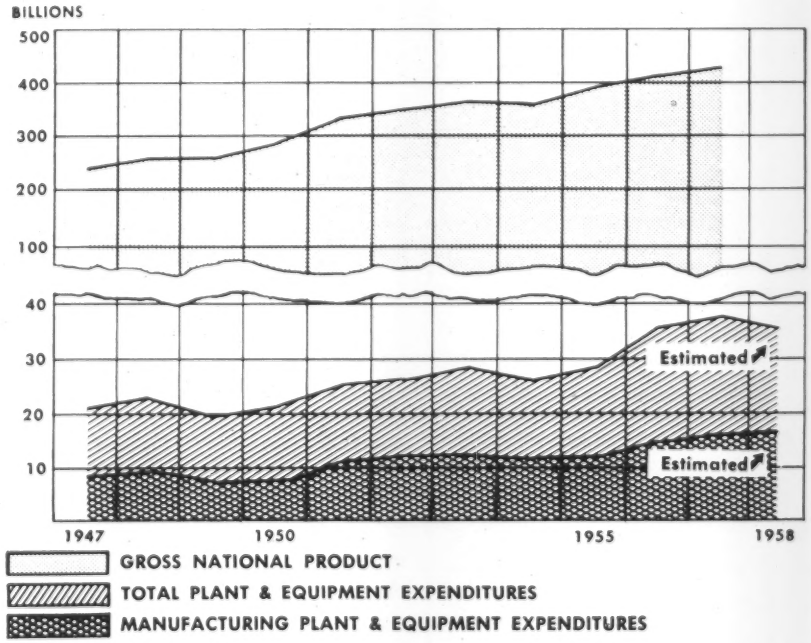
In most specific situations, the national excess capacity, if it exists significantly (as a nation, we shall always need excess capacity), is more apparent than real. For instance, Ronald Peterson, in charge of industrial development for New York State's Department of Commerce, declares that in the industrial Northeast there is a greater percentage of available over-age production facilities—almost all multi-story—than

continued on following page

HOW UP-TO-DATE ARE OUR MANUFACTURING FACILITIES?

During the past decade, capital expenditures for plant and equipment have in general paralleled the steady rise in gross national product. Certain periods show deviations from this trend—for example, the 1949 and 1954 business recessions—but in each case there was an immediate recovery in capital outlays (see chart below). In the ten years 1947–1957, plant and equipment expenditures for manufacturing industries rose from $8.7 billion to $16 billion. This could be interpreted as meaning that America has a large and modern plant—but there are a few flies in the ointment, as will be noted.

RATE OF GROWTH: CAPITAL EXPENDITURES FOR PLANT AND EQUIPMENT COMPARED WITH GROSS NATIONAL PRODUCT



SOURCES: GNP—*Survey of Current Business*, National Income Supplement, July 1957; capital expenditures—Quarterly Reports of Office of Business Economics and Securities and Exchange Commission.

The latest survey of fixed investment intentions conducted by the Office of Business Economics and the Securities and Exchange Commission indicates a drop-off of 13 per cent in 1958. Other surveys echo this in varying degrees. For example, McGraw-Hill's revised Fall survey estimated a drop of 7 per cent, and the Spring survey, due in a few weeks, will undoubtedly show a still larger drop-off for the year.

Changes vary widely between industries. The OBE-SEC survey swings from an increase of 4 per cent for public utilities to a drop of 11 per cent for durables. McGraw-Hill's projection shows a 30 per cent drop for autos, trucks, and parts, and a 13 per cent gain for electrical machinery.

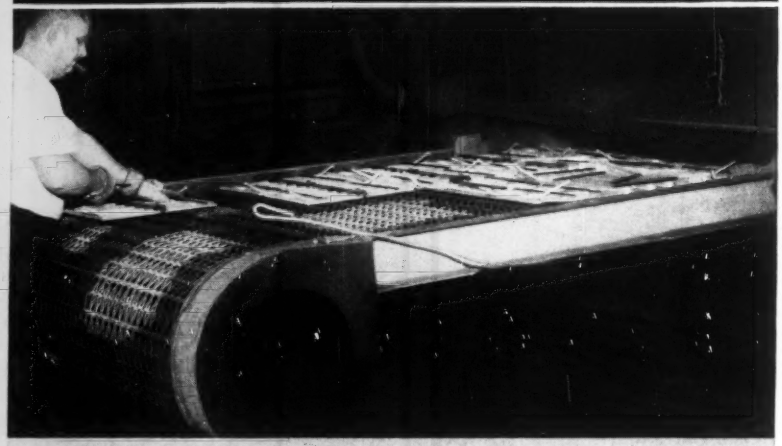
Significantly, out of the 192 cross-section companies responding to our questionnaire survey, 146 stated that the current recession has caused no curtailment in their basic planning for new manufacturing facilities.

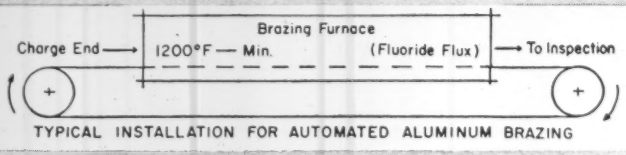
Industry has been plowing back a sizable portion of gross earnings into facilities. Interest charges, for example, which were about 10 per cent of gross returns on capital in 1947, are estimated to have hit 20 per cent in 1957, according to the Federal Reserve Bank of Chicago. Similarly, depreciation reserves are expected to grow to half of total U.S. corporate profits before taxes.

A just-released study by the National Association of Manufacturers takes a somewhat jaundiced view of how modern and adequate America's plant really is. NAM contends that the widely held picture of huge plant expansion since

continued on page 66

Cambridge WOVEN WIRE BELTS





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OFFICES IN PRINCIPAL INDUSTRIAL CITIES

continued from page 63

in any other comparable area of the country. And yet, he says, "We don't have a half-dozen empty modern plants in the state of New York."

Obviously, it doesn't pay to overlook a genuine "bargain" in an old plant. But, as one engineer puts it, "In buying, management wants to be sure that for its purpose it's getting the factory of tomorrow, not the factory of yesterday."

And a specialist in plant location says, "We don't recommend to our clients that they take existing facilities, if they can avoid it. There is always a great deal of expense in converting those facilities to their own use."

This seems to be the viewpoint arrived at by many large companies. For instance, G. E. Garnhard, director of real estate and insurance for Westinghouse Electric Corp., Pittsburgh, which for the past ten years has been in one or more new-plant projects continuously, says, "Before deciding to construct a new plant to our exact requirements, management will frequently ask me to try to locate an existing plant that might be usable. Almost invariably we find that the very few available have too many disadvantages compared to a new plant built to our specifications."

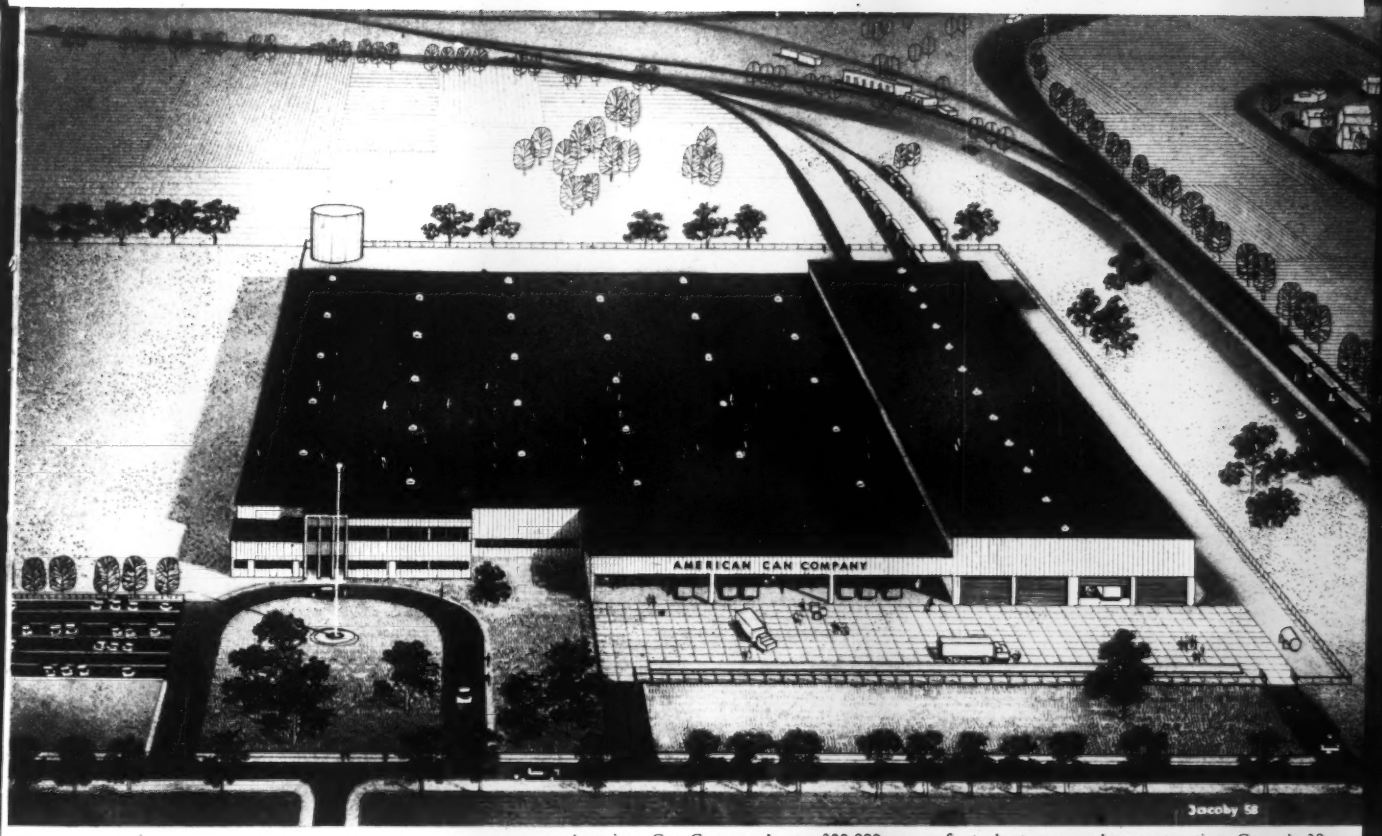
A "Breather" for Planning

The significance of current cutbacks in industrial construction, according to business men interviewed, is that near-term expansion will be carefully planned.

One executive says, "There will be more *strategic* plant and warehouse location. More emphasis will be put on costs, operational and locational, in terms of markets, raw materials, and the like."

This sentiment sums up the pattern for decision making that will be elaborated in the DR&MI report that follows.

THE AUTHOR • Management engineer Carl Heyel, who was in charge of the preparation of this DR&MI Extra Emphasis Feature, also served as moderator of the round table discussions and wrote a substantial portion of the text. Mr. Heyel's background includes experience as assistant to the president of Lehn & Fink Products Corp., conference planning director for the American Management Association, and, most recently as director of planning for the Mergenthaler Linotype Company. He was also chief staff executive of the Mayor's Committee on Management Survey, City of New York.



American Can Company's new 329,000-square-foot plant, now under construction. Canco's 38-acre site at Hammond, Indiana, was assembled by New York Central's Plant Site Consultants.

How New York Central helped American Can find an ideally located plant site in Indiana

MANY PROBLEMS needed solving before American Can Company could decide on the site for its new coil-processing center. New York Central came up with several good locations.

A 38-acre site at Hammond, Indiana, met Canco's requirements. The location was ideal for easy accessibility to tinplate and steelplate supplies. It was also a short and low-cost rail haul for shipment of plate to Canco plants in and around Chicago.

New York Central Plant Site Consultants assisted in assembling the land needed for the plant site, negotiated with owners for sale of this property, supplied labor data, helped solve drainage problems, built a special spur track to the American Can Company property.

New York Central has other plant sites, ranging in size up to 600 acres, in the Hammond, Indiana-Chicago and Lake Calumet, Illinois, area. In Alsip, Illinois, 18 miles southwest of Chicago's Loop, New York Central is developing Cal-Sag, a modern industrial district with sites available from 10 to 100 acres. Many other sites are also available.

What New York Central was able to do for American Can Company, its Plant Site Consultants can do for you. Let New York Central be your source of reference in locating a plant site to meet your needs. Write to Henry W. Coffman, Manager, Industrial Development Department E, New York Central Railroad, La Salle Street Station, Chicago 5, Ill.

New York Central can help you too!

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Large or small, there's a "Central" location on the modern 11,000-mile rail network of the New York Central System that meets your plant-site requirements.

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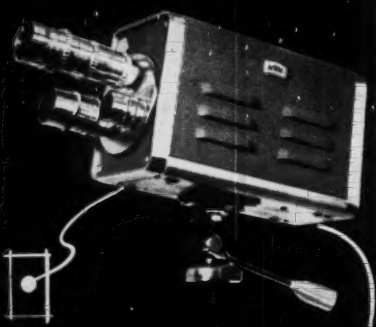
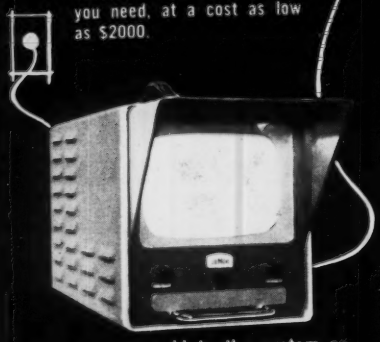


It's no "big deal" to start using Du Mont Industrial Television in your operation. A camera and monitor is all you need, at a cost as low as $2000.



And, you can add to the system as needs arise — all Du Mont Industrial Television equipment is designed for future expansion — start now and grow later with Du Mont!

Du Mont Industrial Television is demonstrated, sold and serviced by local, competent contractors in all parts of the country.

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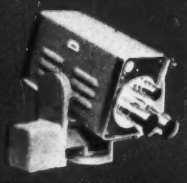
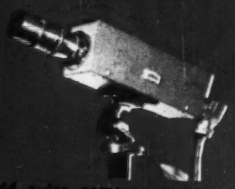
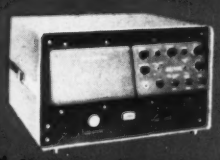


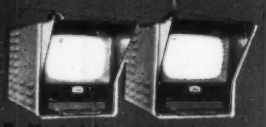
Add remote camera control at any time. Permits side-to-side, up-and-down camera movement, and lens change from a remote location.



Add extra cameras as you need them. Du Mont offers a choice of two basic cameras to better fill your exact requirements.



And as your system grows, Du Mont central control equipment can provide complete, supervisory control over the entire system from a single location.



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HOW UP-TO-DATE?

continued from page 63

World War II is exaggerated, and that only about a tenth of business expenditures for fixed assets in recent years represented net expansion. The rest was required for replacements and improvements. "These results grew from the effects of long-range inflation," says NAM, "where allowances made for depreciation are less than the actual cost of replacing the capital consumed."

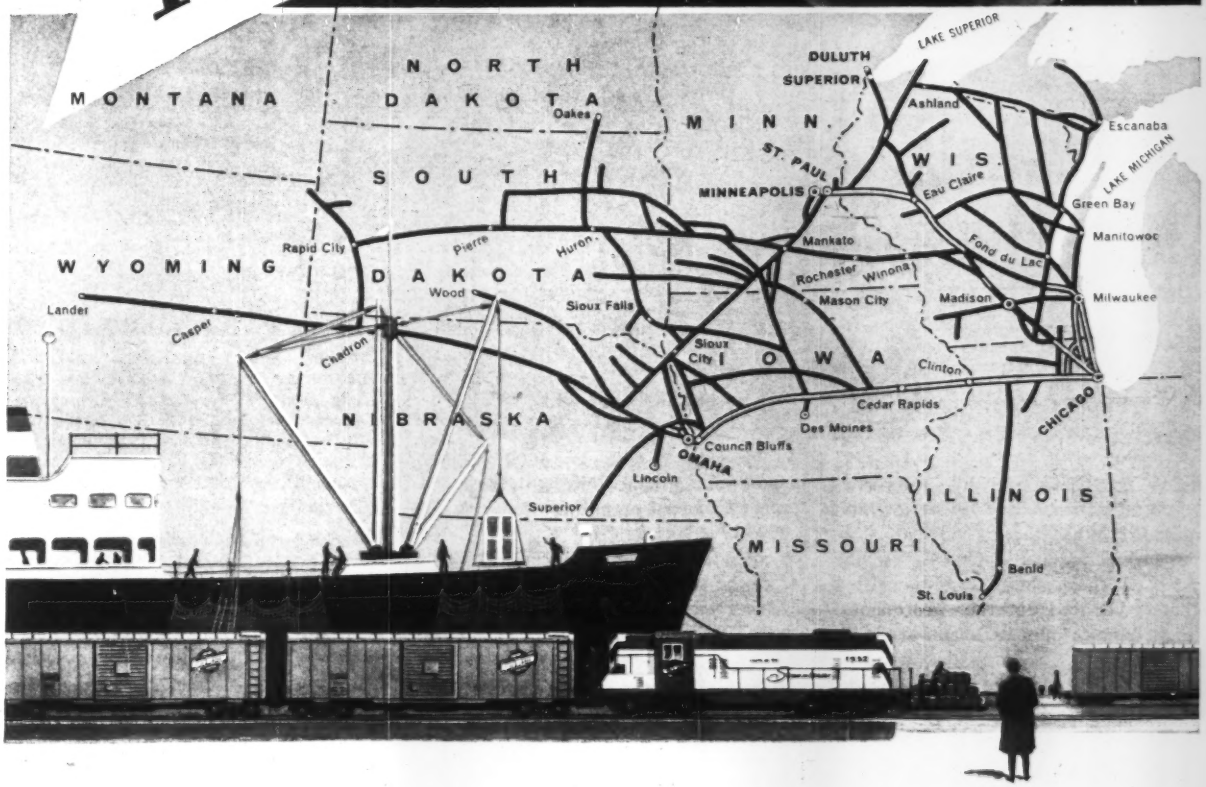
Considering that we are on the threshold of the age of automation, the job of modernization—quite aside from new-plant construction—may not have been done too well at that. As late as November 1957, Vice President A. C. Monteith of Westinghouse reported on a survey of 550 important manufacturing plants in the United States—plants large enough to have a complete engineering staff devoting full time to electrical considerations. The survey showed that 100 per cent—every one of the 550 plants surveyed—had main transformer capacity inadequate for the loads needed, based on ten-year growth; 52 per cent had low incoming voltage; 85 per cent had inadequate main breaker capacity; 94 per cent had no automatic load ratio control; 89 per cent had no main substation bus protection; and 94 per cent had no 277-volt lighting. These were plants of major importance—many of them new. "If that's the situation in these major units," says Monteith, "what is it in the small ones?"

The facts of life in our dynamic age indicate that America as a nation *must* expand and modernize its plant over the next two decades, simply to meet the minimal demands of more people for more things.

Population increase in this country alone focuses the issue: 193.3 million Americans by 1965, according to the latest estimate of the Department of Labor. By 1975, the Census Department's latest "high" estimate of 230 million may prove far short of the mark. (The upsurge since World War II has already caused frequent upward revisions.) Combine this with steadily expanding wants, the drive for shorter workweeks in all industries, and the demand for a rise in living standards by hundreds of millions of people in underdeveloped Asia, Africa, and the Middle East. Keep in mind defense needs. Then even the seemingly fantastic estimates of future requirements advanced in some quarters look like bare minimums.

Why Build—and When? page 68

The World is Yours!



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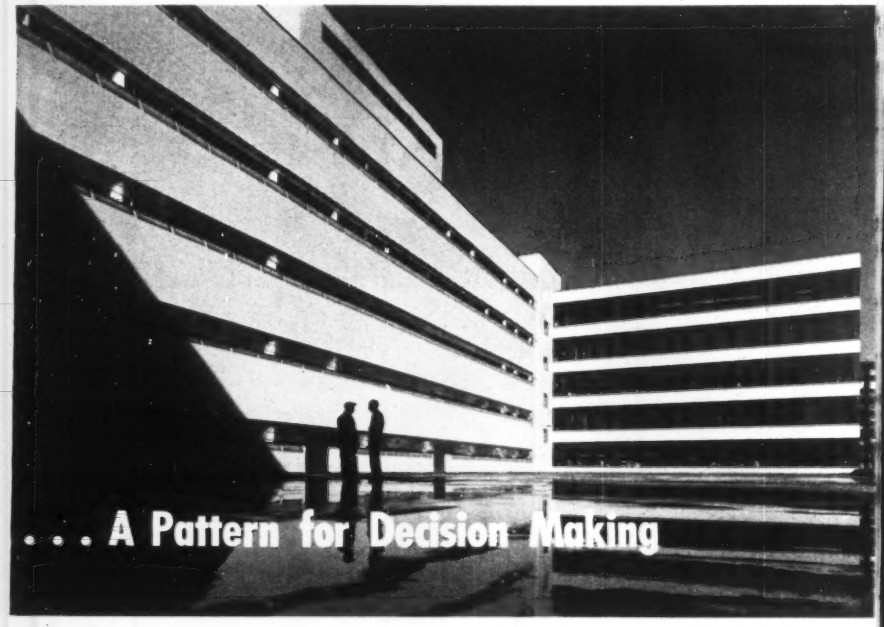


WHY BUILD—AND WHEN?...

... A Pattern for Decision Making

HOW DO SUCCESSFUL companies size up their present and future facilities problems? What factors do they consider in arriving at the *what*, *when*, and *where* of their plants for tomorrow? What guidance do the professional groups have to offer management in assessing needs, location, the latest in factory design, cost-saving approaches to construction, and developments in layout and materials handling?

In later pages we report the developments and trends that are shaping management's thinking about tomorrow's factories (pages 90, 98, and 118). Case-study examples give pertinent experiences of new-plant "imagineering" in capsule form. DR&MI's canvass of the field points up the kind of management thinking that must underlie specific commitments for new facilities.

The replies to DR&MI's survey questions, interviews, and the detailed round-table discussions of problems add up to a four-point pattern for decision making:

1. MORE LONG-RANGE PLANNING IS NEEDED IN MEDIUM-SIZE COMPANIES.

In view of the extensive commitment represented by most new facilities, it would seem axiomatic that sound long-range programing must form the basis for management's building decisions: volume and profit objectives, new-product planning, marketing concepts, and personnel planning—all finally wrapped up in a financial program.

However, except for the very large organizations, long-range planning seems to be the exception rather than the rule.

We contacted a cross-section of more than 250 medium- and larger-size companies by questionnaire and interview. They reported that additional plant construction planned for the next five years will add up to about 20 per cent of present area. But with very few exceptions, this appears to be based on a "general feel" of sales expectations, rather than reflecting firm programs with centralized responsibilities and coordinated, formalized facilities planning. This is, of course, a spot conclusion. However, when it was checked with the professional groups who become involved in industrial building programs—management and marketing counsel, engineers, architects, and builders—concurrence was almost unanimous.

We specifically raised the question of the degree to which the programing approach is taking hold, even if only in an incipient way, in medium-size companies—those in the 1,000-to-2,000-employee class. Comments varied. Ebasco Services, for instance, said, "The nineteenth-century methods in many companies shock us. In many plants we don't see *any* evidence of long-range planning."

Booz, Allen & Hamilton was somewhat more encouraging: "More companies are coming to centralize responsibility in a single executive for a long-range look at things, often as a full-time job."

But all agreed that the programing approach, such as it is, is still found almost exclusively in larger enterprises.

(Presidents' Panel Report No. 4 in DR&MI, January 1958, page 32, indicated that four-fifths of the subject companies carry on some formal planning within the generally accepted span of five years; but nearly three-fourths of

PROFESSIONALS ON MANAGEMENT'S TEAM

"How early in the planning for new facilities should management bring in the architects and engineers?" DR&MI asked in a special survey.

	Large Companies	Small Companies
At very earliest stage	**16**	**37**
After plans are largely crystallized	**19**	**37**
Total responses	**35**	**74**

the Panel companies are among the 400 largest industrials in the United States.)

"Many times people get sucked in by what appears to be an enormous market," remarked one executive. "A lot of companies rushed into transistors when they first came out, assuming there was going to be a huge market. One kingpin in electronics closed down a whole plant as a result of the disastrous glut."

A recurring complaint on the part of manufacturers was that there is no convenient crystal ball to show up the unforeseeables affecting future markets and products. And yet, it can be done. National Aluminate Company, Chicago, is an example of a nongiant (about $40 million annual sales) in the chemical field that has organized for planning. Vice President Harold Spaght reports:

Our first forward planning covered a period of five years, and we were within 3 per cent of the schedule. We have 350 different products and seven plants, of which two are in Europe and one in Canada. Each manager must prepare his program (and since we are in the chemical business, this includes extensive research). We then project these figures and decide what manufacturing facilities will be required, because we know from experience how much new production must come in each year for us to maintain our desired growth. Five years from now, as much as 35 per cent of our sales may be in products not now developed. The president is directly responsible for programing.

This year we are required to submit a ten-year program—which becomes more difficult. But if you take the long view, an economic adjustment, such as the country is experiencing now, doesn't throw you into a panic—such fluctuations are expected.

Gardner-Denver Company of Quincy, Ill., major producer of compressors, pumps, rock drills, and air tools, is another case in point. This company has undergone steady growth and repeated expansion of facilities ($72 million sales in 1957, more than doubled since 1954). President Gifford V. Leece reports:

We gear plans for physical expansion to a long-range sales forecast continually corrected for the short term. Only in this way can crash action be avoided and assurance given that every addition will embody the latest improvements in methods, materials handling, and work flow.

To set up the program, the company engaged consultants to analyze all departments and recommend a near plan, a plan for one year hence, and a ten-year program of expansion.

To the question, "How can top management know when physical expansion of an operation should be considered?" Leece said that he demanded explanations from operating heads on two critical indicators: complaints of slow deliveries from customers and a pile-up of inventory in process, as revealed by the regular monthly accounting report.

The recently completed major expansion of foundry facilities in Quincy illustrates Gardner-Denver's approach. Detailed plans for the expansion were laid out more than five years ago. As the company exceeded its projected growth curve, the plan was put into effect two years ahead of the schedule.

2. Need for Flexibility

Involved in long-range programing is the need, under today's conditions of rapid change, to preserve as much flexibility as possible—that is, to give management elbow-room.

Concern for flexibility now colors almost all management thinking about facility needs, location, and type. It was repeatedly given as the reason for moves into outlying acreage by the companies surveyed for this report. Sherwood Egbert, executive vice president of McCullough Motors Corp., Los Angeles, told DR&MI:

Our new 100,000-square-foot plant in Canada is on 37 acres of land. If you looked

HOW AMF CYCLE COMPANY BUILT IN FLEXIBILITY

Built-in flexibility was one of the key planned-efficiency requirements for the 216,000-square-foot plant of the AMF Cycle Company Division of American Machine and Foundry Company in Little Rock, Ark. Opened in 1956, it was built by Butler Manufacturing Company. Plant Manager Frank H. Cankar lists a dozen design features that will take care of tomorrow as well as today:

1. *Ceiling heights* are 13 feet in the valleys and 19 feet at roof peaks. This lends flexibility to layout, because no equipment used is over 14 feet high, and 95 per cent of it is under 10 feet.

2. *No walls* between various departmental operations—not even between parts storage and production. In case of alterations, it is easy to take from or add to the floor space occupied by departmental functions. In some instances, equipment is not even lagged down to the floor and can be moved without floor patching.

3. An *electrical bus*, strategically located, means only a few man-hours are usually needed to move an individual machine.

4. *Compressed air and steam lines* have been provided even in areas where these facilities are not now used to provide for future use.

5. *Gravity ridge vents* throughout, even in storage areas, lend flexibility to ventilation. With the aluminum-sheeting type of roof, moving process exhaust stacks is simple and inexpensive.

6. *Flexibility in materials-handling equipment* results from hanging conveyers from the building's structural steel and not having to provide special structure or reinforcement.

7. *Electrical services and substations* are sized 50 per cent over maximum demands for peak production, to provide power for future production equipment improvements, moving toward greater mechanization and perhaps automation.

8. *Boilers and compressors* are also oversized and will permit expansion up to 100 per cent by sacrificing stand-by facilities for continuous production operations.

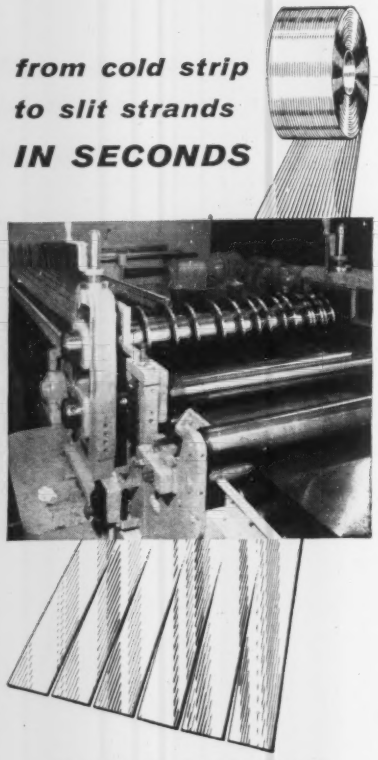
9. *Oversize of gas and water mains* and distribution lines will permit expansion up to 75 per cent. But increasing their capacity will be simple because of the overhead location of the piping.

10. *The incoming railroad* is laid out in such a way that a branch spur can be taken off for building.

11. *Lights* are hung high in the ceiling and are independent of actual machine operations, permitting rearrangement without changing the lighting.

12. *Expansion* for the manufacture of bicycles or associated products could be provided on the north by an addition to the present building. For another type of product, expansion could be either east or north in a separate building. AMF could build at least 500,000 additional feet of ground-level floor space and the company holds an option on adjoining property.

from cold strip
to slit strands
IN SECONDS



YODER ROTARY MULTIPLE SLITTERS

A Yoder slitter converts mill-width coils of flat-rolled metal into many variable-width strands in amazingly short time. Speed, coupled with great accuracy and low manpower requirements, makes a Yoder slitter an important factor in keeping production and overhead costs down.

Operated by only two men, the Yoder Type 3-48 slitter illustrated is designed to accommodate standard mill-width coils up to 48 inches wide, in a variety of metals and thicknesses. The slit strand widths can be held to within a .004" tolerance.

Even if your steel requirements are as little as 100 tons a month, the savings to be realized in time, manpower and raw material costs alone will pay for a Yoder slitter in the first few months of operation.

There is a Yoder slitter designed and engineered to meet your requirements, and to speed the delivery of "special" width stock in a wide range of large or small sizes. Send for your free copy of the fully-illustrated, 76-page booklet, "Multiple Rotary Slitting Lines."

THE YODER COMPANY
5531 Walworth Avenue • Cleveland 2, Ohio

ENGINEERING YODER MANUFACTURING **ROTARY SLITTING LINES**

FRUITS OF EXPERIENCE

DR&MI asked managements that had been through the mill with a new-plant program: "What single cost-saving suggestion can you offer to others embarking on a program of plant construction or expansion? What specific waste of time, effort, or money would you avoid in a future program?" Almost all responses stressed adequate forward planning. But here are some additional comments:

"Examine at least two alternatives. Here, bigamy is a lesser offense than falling in love with one plan exclusively."

"Follow scientific and technical literature for the latest processes or even imaginary processes."

"Use three-dimensional models, and place them where all those in charge of functional responsibilities can play with the model over a period of time."

"Don't have too many cooks."

"Materials handling is of utmost importance to us, but we unfortunately tended to oversupply on the old method of materials handling by crane and undersupply with the newer method of fork-lift truck."

"Have all structural and exposed steel shop-coated with a rust-preventive paint in the color you will finally use to decorate your building, instead of using red lead or zinc chromate, thus saving the repaint bill on steel after it is up."

"Build what you think you will need for the next five to ten years, but acquire enough adjacent land to build on for the next twenty years."

"Spend more time on ventilation, heating, and lighting. These are the factors which we have found create most problems in a new plant."

at our substation there now, you'd probably ask why it's in the middle of nowhere. But we built with programmed expansion in mind, and as we add bays later on, it will be just where we want it. Two walls in the new plant are temporary, to facilitate "stretch-out." In our Los Angeles operations, we've also built in flexibility—at some additional expense. Our new single-story buildings are designed to support two stories, and we've installed piping, sewers, water, wiring, and so on, for maximum potentials. Our layout is based on 80-foot modules—all according to a master plan. We have 2,000 people there, but if necessary we could build for 10,000.

In contrast, there is the case of a large equipment manufacturer who, after a relatively few years of sporadic additions to his plant, has now come to the end of his tether for economical expansion on a site hemmed in by two rivers.

Flexibility is required not merely for expansion of physical space but also for insurance against pending technological breakthrough or competitive advances. These can bring drastic changes in method of manufacture or even in the nature of the product. Of the 192 companies responding in detail to the mail questionnaire in our survey, 80 reported increases during the past five years in the number of products manufactured—a startling 42 per cent.

In a survey made by DR&MI in 1956 (DR&MI, September 1956, page 57), 38 per cent of almost 400 companies stated that they had changed basic materials in the preceding five years, and 59 per cent indicated that they were going to change basic materials between then and 1961.

Such changes often demand further changes in equipment placement and layout, materials handling, and storage.

"Without built-in flexibility," one builder states flatly, "new processes developed through research will make much of our present industrial capacity obsolete within the next few years."

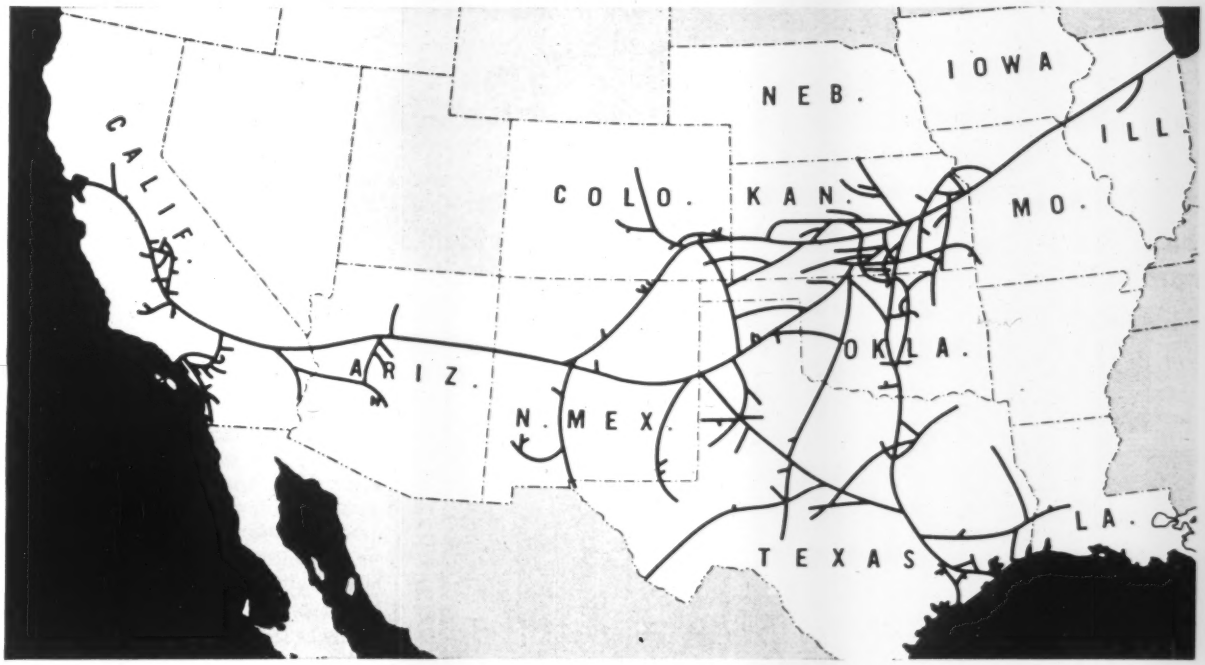
All things considered, a practical policy indicated in this survey would seem to be that management may well countenance even a significant increase in first cost of building in the interest of the long-run economy to be achieved by flexibility. In this connection, possible materials-handling changes should be given special attention.

"For example," one construction executive points out, "it may be advisable to place overhead supports closer together than you normally would for economy in first cost, but in this way you provide for spanning of overhead conveyers should they ever come into the picture."

Reports R.D. Jones of Automatic Transportation Company, Chicago:

We try to get people to build on the basis of what they may be getting into in the future. If some one wants to put in a drag line, we pound on this: "Are you convinced that in five or ten years from now you are going to use a drag line?" If they are sure, then we put it in the floor. But if there is a possibility that they may want to change, or if they simply don't know, then we urge overheads.

Locate your plant in America's fastest growing area



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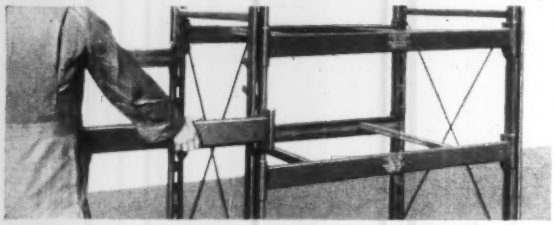
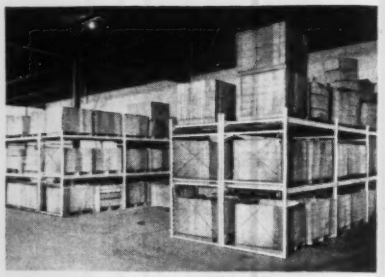
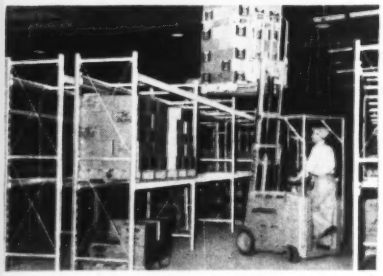
STORAGE RACKS



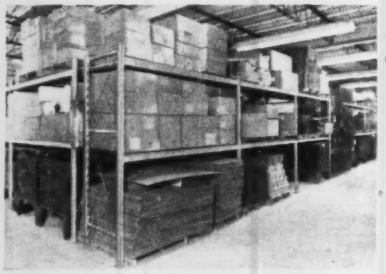
raise and lower like a window

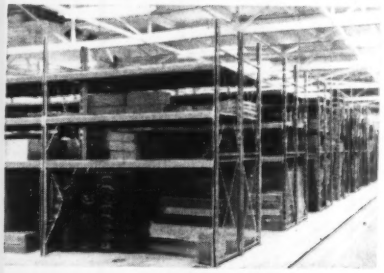
the modern racks that will meet any storage problem more efficiently... more practically... more economically





send for catalog!





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Does taking advantage of automation mean a sacrifice of flexibility? Not necessarily, say automation experts. In fact, contrary to the assumption that automation always implies more rigidity, it may mean less, if properly planned.

It is true, as John Diebold, a specialist in this field, points out, that some managements have burned their fingers on highly automated facilities of the so-called Detroit type. The widely publicized transfer machine is an outgrowth of the machine tool and assembly line concept. It permits successive machine steps, often including loading and unloading of machines, to be linked together. Because of the long runs required, the economic limitations of this type of automation are severe.

On the other hand, self-correcting feed-back control devices can achieve high flexibility in a wide variety of functions, including job-shop operations. Highly automated plants, Diebold says, call for careful planning of a shell built around processes (sometimes only around controls).

Eliminating the Shell

As a result of automation, a new trend in building design for the process industries is developing, according to Monsanto Chemical Company. It is a flexibility that comes with minimal investment in structures. Called "outdoor units," the actual processing mechanisms are not in a building at all. A small control center for operators—usually air-conditioned—is the only enclosed space. Manufacturers of electrical equipment and controls say they are feeling the effects of this trend in stepped-up demand for weather-resistant outdoor equipment.

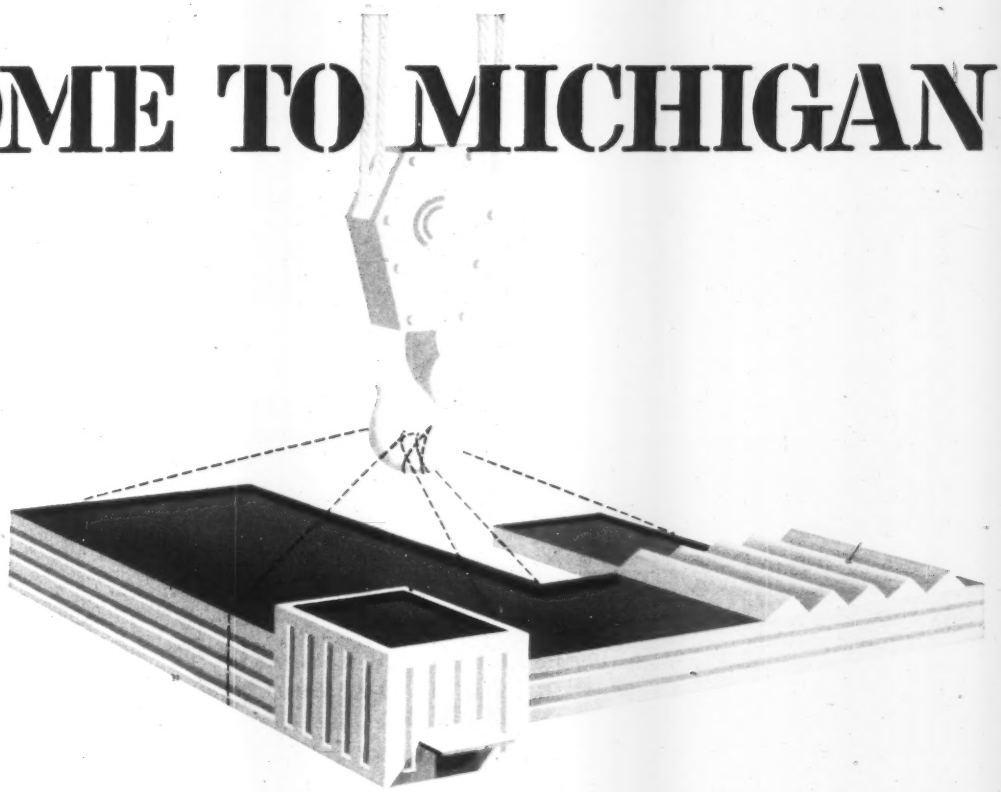
Another example of flexibility with automation is the concept of the "mother plant"—where the basic manufacturing is automated as fully as possible, and parts are shipped to various areas for economic assembly. When bulk raw materials are used, another economy measure under consideration is to send actual parts of a plant—automated units on freight cars, for example—to the materials, rather than the other way around.

3. The Integrated Point of View

Repeatedly emphasized in the DR&MI survey was the need for management to integrate its thinking about facilities—that is, to see the picture as a whole.

Materials handling, for example (see page 122), can no longer be looked upon as simply in-plant transportation. It must be conceived as an integrated

COME TO MICHIGAN!



Pictured here are but nine of the many nationally renowned companies which have recently selected Michigan as a point of major operations. To be sure, these companies are vastly different in their character, in their size and in their industrial requirements. Yet, each found in Michigan the ideal answer to its plant and operational needs—a wide variety of superb industrial sites, a great abundance of skilled, trained labor, the unrivaled wealth of power, water and natural resources, and the finest possible spirit of community cooperation. If you are currently searching for an industrial location, think *first* of Michigan! We will be happy to assist you. Write for new brochure of Michigan information.

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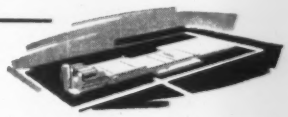
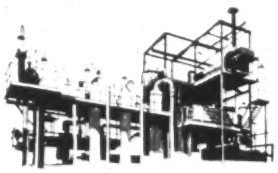
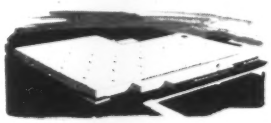


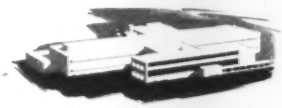
The new Corning Glass Works in Albion, makes television tubes and related items. Employment is almost 1000.



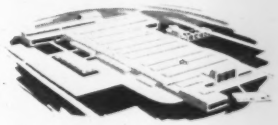
The new Du Pont Chemical Company neophrene plant in Montague, Michigan, cost more than $15,000,000 to build.



The new Michigan Container Plant located near Three Rivers, expects to employ from 600 to 800 workers.



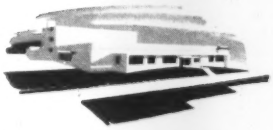
This new multimillion-dollar research plant, near Detroit, was completed recently by Bendix Aviation Corporation.



This new Bridgeport Brass Company plant in Adrian, Michigan, makes forgings for the aircraft and auto industries.

This $14,000,000 structure at L'Anse, Michigan, is scheduled for early completion by the Celotex Corporation.

This new Michigan home of the Hermetic Motor Department, General Electric Corporation, in Holland, employs 500.



Calgon, Inc., produces household water softeners in this new plant located on a 45-acre tract at Rockwood, Michigan.

Caustic soda, chlorine and hydrogen are produced in Hooker Electrochemical Company's new plant at Montague.

Like interest . . .

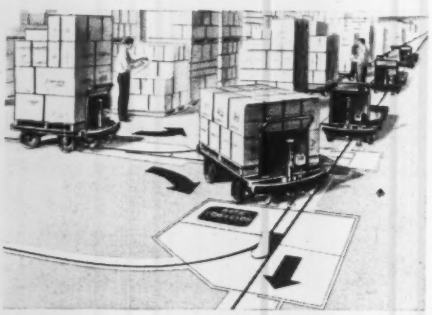
PROFITS SHOULD COMPOUND, TOO!

▶ Compound profits is a subject for sober study in today's business economy. Through careful planning and operation, profits can actually compound, much the same as interest does, and without proportionate tax consequences.

Many facets of business operation must be considered to achieve maximum rate of compounding profits. These are covered, one by one, in a series of booklets specially prepared by a widely recognized firm of Certified Public Accountants. One of the most important facets, buying with tax savings—not after-tax dollars, is discussed in the first of these booklets entitled, "Internal Financing". It is yours without obligation upon your letterhead request.

Modern conveyorized materials handling (Webb's specialty) will drastically improve your profits . . . this is an established, provable fact. This booklet is designed to assist you in realizing these higher profits sooner through better tax planning. As a matter of fact, this booklet applies not only to conveyors but to all capital equipment purchases.

Your copy is waiting . . . may we have your address, soon?



▶ All materials handling at the Johnson & Johnson "Plant of Tomorrow" centers around this 3624 foot long, electronically controlled Towveyor. Each tow truck is equipped with a 19-station Towmatic selector switch—each station representing a different location in the plant. Thus, by simply flipping Towmatic switch to desired station and lowering tow pin into Towveyor slot, the tow truck is started on its way—electronics take over and materials automatically travel to their destinations.

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process extending all the way from the supplier through raw-materials storage, processing, and finished storage at the shipping platform to the customer's receiving dock.

Similarly an intelligent attempt at automation obviously requires an integrated point of view that goes far beyond the walls of the plant. For instance, in an automated plant, handling piece parts is very expensive.

DEPRESSION JITTERS

Has the recent leveling off of business caused curtailment of your planning for new manufacturing facilities?

Yes	41
No	146
Total	187

Parts that have to be oriented for positioning and loading into a machine must often be eliminated in planning, in favor of purchasing raw materials for continuous handling through the process. In many instances, this means drawing work formerly done by vendors into the plant.

Dr. Joseph Harrington, Jr., of Arthur D. Little, Inc., adds this cautionary note: "In automation, don't be misled by too many stories of savings in personnel. Look at the whole picture—total employees, including maintenance and other indirect (which may go up), equipment investment, and cost of downtime."

A problem of layout and facilities in a Cleveland warehouse design illustrates the "picture as a whole" concept, because the problem extended far beyond Cleveland. An engineering survey showed that an average number of trailer trucks arrived per week—but in widely fluctuating numbers per day. This posed the first problem of control: to go back where they originated. Second, it was found that when the trucks were opened, they often had several loads for other depots: again, a problem of control at origin. Unless trucks were loaded in proper sequence, checking out would be a cumbersome and wasteful process.

A recurring comment by engineers, architects, and transportation specialists is that they are called into discussions too late.

"Often," said one railroad industrial agent, "management will start building the plant, and then consult the railroad as to how they will get in. If we are

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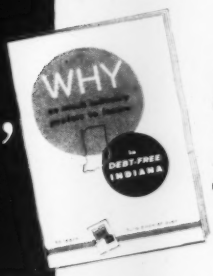

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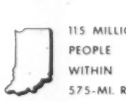

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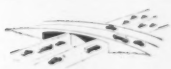

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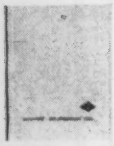
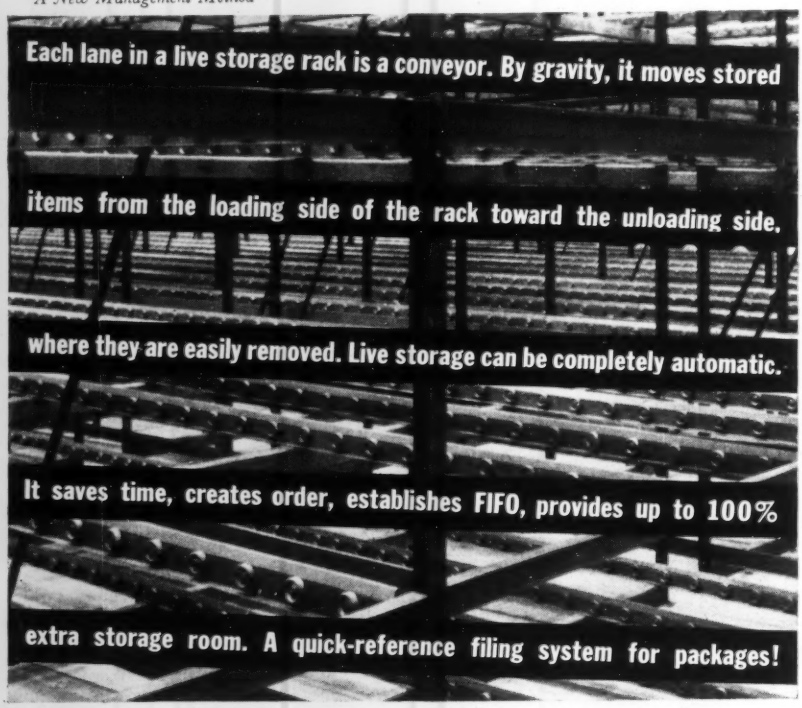


Send for our booklet, "A-F Live Storage Racks, A New Management Method"


Each lane in a live storage rack is a conveyor. By gravity, it moves stored
items from the loading side of the rack toward the unloading side,
where they are easily removed. Live storage can be completely automatic.
It saves time, creates order, establishes FIFO, provides up to 100%
extra storage room. A quick-reference filing system for packages!

A-F **A-F Conveyors**

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consulted in the first instance, we can give valuable help regarding switching. We have to take in account drainage, curvatures, terrain, and the like, to serve the plant. If their engineers get in touch with ours, this can be an easy job."

Perhaps the engineers aren't selling themselves well enough. In our mail questionnaire we asked management at what stage of planning architects and engineers should be brought in. The split was practically down the middle: half voted for "the very earliest stages of planning," and half checked "not until *after* management has made up its mind what it wants."

Strangely enough, managements are accused of not making use of industrial engineers, materials-handling specialists, and traffic experts within their own employ. "Our management seems to think the industrial engineering department should only be concerned with methods and standards and incentives after the plant is built," was one wry observation.

Failure to allow enough lead time for integrated planning was often mentioned as a prime cause of later trouble. A capsule illustration is contained in this terse comment: "We have three divisions: in Wisconsin, California, and Texas. Total employees: 12,000. Sales: $140 million. We decentralized in October of this year without proper preparation, so you can imagine the confusion at this time."

It apparently happens in large as well as in small organizations.

4. The Problem of People

Said the vice president of a heavy equipment company at a DR&MI round table:

> We have a highly mechanized, standardized operation. We have a plant here in Chicago and a plant outside of Montreal that are duplicates in every way, right down to the last item of equipment. And the plant in Montreal, with supervision that isn't as experienced as the plant in Chicago, has a much higher labor efficiency than we get down here. Try and explain that to the Board of Directors!

This comment emphasizes a problem that colors every major decision on plant location, size, and type. It is the problem of people (DR&MI, April 1956, page 98).

In implementing a move, communications can spell the difference between a smooth transition and costly confusion. The Prentice-Hall experience (page 77) illustrates this. In Zenith Radio's recent $8 million expansion program in Chicago, management took special care to inform its foremen completely about all aspects of their operations. Large-

scale models, with transparent plastic floors, were made so that they could see exactly what was going to happen.

Fewer Huge Concentrations

Human problems are a prime factor in the policies of many large corporations on optimum-size facilities. The trend is definitely away from 20,000-to-30,000-employee concentrations. Managerial as well as rank-and-file personnel problems are involved. Westinghouse, for example, has stated:

> We are definitely opposed to large mass concentrations. Our trend is toward relatively small profit centers, partly to develop managerial ability at a lower level—men who will be responsible for profits. Where we can avoid it, we don't go over 4,000 employees and 1 million square feet. Many of our new facilities are in the 500-to-2,500-employee range.

Container Corporation of America also reports that it is settling for smaller plants. Problems of managerial control are the chief reason.

As in many large, far-flung corporations, CCA's division managers exercise a high degree of autonomy. They are expected to be alert to their own expansion needs, and to present top management with rather thoroughly worked out facilities studies, proving payout in at least five years. The company's senior vice president, Leo Schoenhofen, says of this policy, "While we have to watch purse-strings at the top and can't pass all requests, one gage we use to judge the potentials of our executives is this sort of programing from the bottom up. We want our managers to come in fighting for the wherewithal to build their businesses."

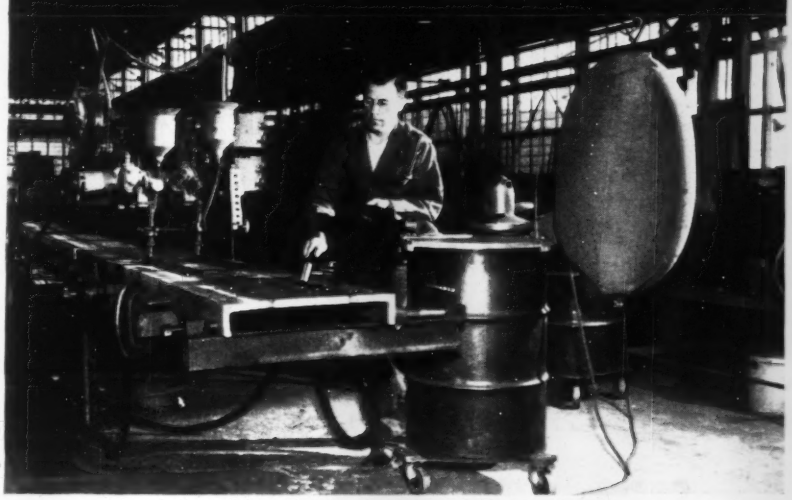
The DR&MI field survey indicated that air-conditioning for comfort, as opposed to process requirements, is still negligible in management's factory-building plans for today and the immediate tomorrow. But practically all of today's new plant office buildings have air-conditioning (see page 113).

Far-sighted managements are today incorporating ductwork and other air-conditioning provisions into their designs, to be ready for conversion.

Esthetics also plays a part in solving the "people problem." Usually at little or no additional expense, managements can provide pleasing, often beautiful building exteriors. These, combined with attractive landscaping, not only advertise the company if the plant is in view of a well-traveled highway, but also attest to management's interest in the community.

"Imagineering" the New Plant, page 79

A TORNADO® REDUCES PRODUCTION COSTS



Grove Valve and Regulator Co., Oakland, California use Tornado Jumbo Vacs in flux recovery on large weldments.

A typical application is the Grove Valve and Regulator Company, where Tornado Jumbo Cleaners are used to recover welding flux, an important savings in production costs.

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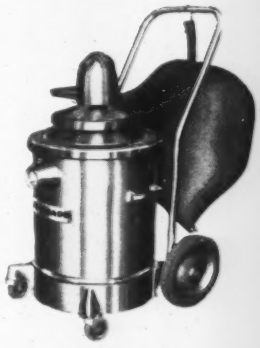

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With large 10" Carrier Wheels.

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For over forty-five years the Mahon Company has served industry across the country by supplying its continuing needs for specially engineered plant equipment and specially engineered production processing equipment. This is tailor-made equipment designed and built to do specific jobs efficiently and economically . . . it covers a broad range of items from complete, mammoth, conveyorized Finishing Systems to such smaller items as Trucks, Skids, Pallets, Conveyor Hangers, Adapters and Racks.

In the construction of new plants, office buildings, powerhouses and special purpose structures, the Building Products Divisions of the Mahon Company have supplied and erected the Structural Steel, Steel Plate Components, Steel Roof Deck, Metal Curtain Walls, Underwriters' Rated Metalclad Fire Walls, Rolling Steel Doors, Electrified Steel Sub-Floors, Acoustical Metal Walls and Partitions, and Combined Structural Roofs and Acoustical Ceilings.

The Mahon Company today, with its staffs of highly specialized engineers and service personnel, and its expanded fabricating and erection facilities, is in a position to render even a greater service to you in both the construction of plants and in meeting your requirements in specially designed plant and production processing equipment.

See Sweet's Files for complete information, or write for Book covering Mahon Products and Services. The R. C. Mahon Company, Detroit 34, Michigan.

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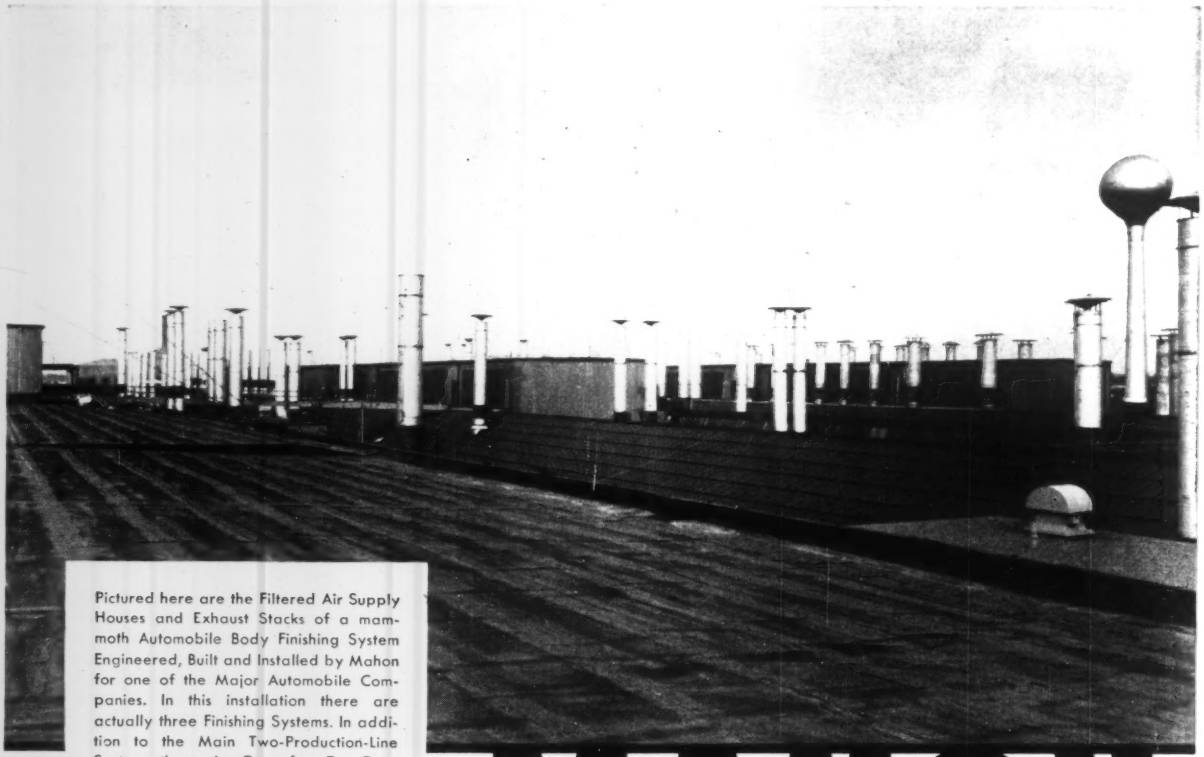

Pictured here are the Filtered Air Supply Houses and Exhaust Stacks of a mammoth Automobile Body Finishing System Engineered, Built and Installed by Mahon for one of the Major Automobile Companies. In this installation there are actually three Finishing Systems. In addition to the Main Two-Production-Line System, there is One for Two-Tone Finishing, and One for Final Repair Finishing after trim operations.

MAHON

"IMAGINEERING" THE NEW PLANT

An A-to-Z Case Study

At Prentice-Hall's new plant and offices in Englewood Cliffs, N.J., buildings are of aluminum and brick. Glass in Unit No. 1 is tinted to protect the books from sun. Parking for all employees is provided by three separate parking areas, each near the entrance most convenient for each group of employees. Designed by Kahn & Jacobs, New York.

"AS AN OPERATING executive, I had been cramped for 30 years—always had growing pains—and swore that when we made this move, we'd do a real job of planning ahead. As a matter of fact, when we were well along in our early analyses, I took another hard look at our growth curve, and upped the ante by 50 per cent on our Unit No. 1—warehousing and shipping.

"I raised our sights to include continued high growth for fifteen years. Result: 150,000 square feet of modern shipping and handling facilities, instead of the 100,000 first contemplated. We're using the extra space now for some operations to be housed in our Unit No. 3—already programmed—and we have ample acreage for any eventuality beyond that."

These remarks were made by Vincent C. Ross, vice chairman of Prentice-Hall, Inc., who was in charge of planning this publishing company's new facilities at Englewood Cliffs, N.J.

Unit No. 2, a two-and-one-half story, completely air-conditioned structure of 153,000 square feet, opened on schedule in July of last year. It houses editorial and business operations, a cafeteria, and recreation and training rooms. Some 1,500 employees are now at work in the two completed units. Prentice-Hall also has 500 employees in sales and at the New York City and branch offices.

Planning began in a serious way in 1949. By that time, employees, exclusive of salesmen, numbered some 1,100, with continued growth indicated.

It was obvious that the shipping and warehousing operations had to be put on a production basis, with all waste motions cut out. Orderly scheduling was essential to eliminate overtime, which was not only extremely costly but was causing serious personnel problems as well. During peak seasons, employees had to work seven-day weeks.

A study of the handling methods and an analysis of office automation as a way to improve order handling, routing, and sales control showed the need for a whole "new deal"—that is, a warehousing and shipping facility built around a modern conveyerized system. This new system would also permit the company to take full advantage of the data-processing improvements.

Here's how Prentice-Hall sums up its formula for tackling a facilities program:

1. Know your objectives—and face up to the problems involved.
2. Plan in advance and in detail. Allow yourself enough time.
3. If possible, provide for programmed phases.
4. Centralize responsibility.
5. Pay attention to community problems.
6. Play fair with employees by giving them adequate information as soon as possible.
7. Prepare them for an orderly transition.

In choosing a location for the new plant, Prentice-Hall decided early that the nature of its services required easy access to New York City as the publishing center of the country. This decision was also dictated by long-standing supplier relationships. So a thorough study of surrounding counties in Long Island and other sections of New York State, Connecticut, and New Jersey was immediately undertaken. Detailed analyses were made of shipping facilities, travel time to New York offices, tax assessments and rates, and comparative real estate and construction costs. No siding was needed—most of the company's products go out by parcel post.

The Tax Factor

The study of suburban areas indicated that real estate taxes there would undoubtedly go up. (One-family houses in the moderate-price range do not produce enough tax revenue to offset the cost of schools and the police and fire protection afforded.) This consideration ruled out areas with new large-scale housing developments.

An independent check of construction costs showed that the variation among areas under consideration would

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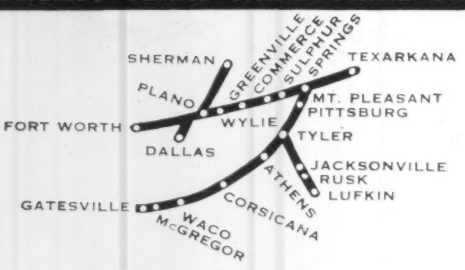

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in all probability not exceed 10 per cent. Prentice-Hall did not consider this a controlling factor.

When Englewood Cliffs, N.J., was finally chosen as the best site from all points of view, a thorough public-relations job had to be undertaken. With the exception of a lumber yard, there was no other industrial operation in this residential community of only 800 voters. To sell the citizens of the town the idea that the company would make a good neighbor involved working with local councils and officials, attending town meetings, and so on. The selling job was successful, but it took two and one-half years and much local legal assistance.

Facilities planning now began in earnest. In organizing for this, Prentice-Hall centered responsibility on one man —Vice Chairman Ross—rather than in a committee. This facilitated decision making, although, of course, top officials and the Board were kept fully informed of major issues and made the decisions on them. The program for the project was developed in three-year periods: Unit No. 1 for 1953 and Unit No. 2 for 1956. Unit No. 3 is shortly coming to the detailed planning stage. The architect's staff and associated engineers sat in on all planning sessions.

A concentrated schedule of education in advanced practice was undertaken. Ross, Operations Manager Jules C. Tonsmiere, and other operating personnel, together and severally, visited at least a hundred plants, went to materials-handling expositions and shows, studied conveyer application with manufacturers, and met frequently with the architects and engineers for detailed discussions of their findings.

In-Plant Feeding Facilities

Projects were set up to cover every important factor. The company cafeteria is a case in point. Some 50 cafeterias were visited. The ultramodern dishwashing installation, for example, was patterned after the one at Manhattan College in New York City. The self-service lines can handle sixteen tray-bearers a minute. Pleasing pastel colors, acoustic ceilings, and a huge picture window overlooking a landscaped terrace suggest the atmosphere of a high-priced dining club (the modest checks happily belie it). The cafeteria was designed to double as a place for shows and other functions.

Attention to detail is illustrated by the special acoustic baffles (movable sound barriers) in the area where employees stack their trays after eating.

Major project in the new facilities is the roller conveyer system, running almost the entire length of the 672-foot building and feeding the assembly-packaging operations.

This was an especially noisy operation in all the cafeterias visited.

Another project example is employee parking. Here, management confesses that it underestimated the need. Entrance, egress, and maneuvering room were designed for an expected ratio of four employees per parked car. Indicative of today's high standard of living, experience has shown the ratio to be less than two to one.

The major project, of course, was the conveyerized system for Unit No. 1, where a roller conveyer runs almost the entire length of the 672-foot building. Bins holding several thousand books and an additional 1,000 pamphlets flank both sides of the roller conveyer line, which is composed of parallel sections, the middle one powered. On the outer sections, the order picker pushes small pallets upon which he stacks the items called for by the order copy.

The central, powered section of the conveyer carries completed pallets back to the automatic weighing and postal-zone scale, then to an assembly-line packaging operation, past carton sealing and labeling, to weighing and automatic stapling. The packages are finally carried by overhead conveyer to the Class A contract Post Office on the premises.

With vivid memories of trucking problems at the New York location, Prentice-Hall planned ample loading and unloading facilities, with room for seven of the largest-size trailer units. Hydraulic dock boards, adjustable to any truck-bed height, permit unitizing and skidding extremely heavy loads.

After the basic job of planning and design came the problem of selecting the constructor, which for Unit No. 1 took six concentrated weeks. Local contractors were decided upon—different ones

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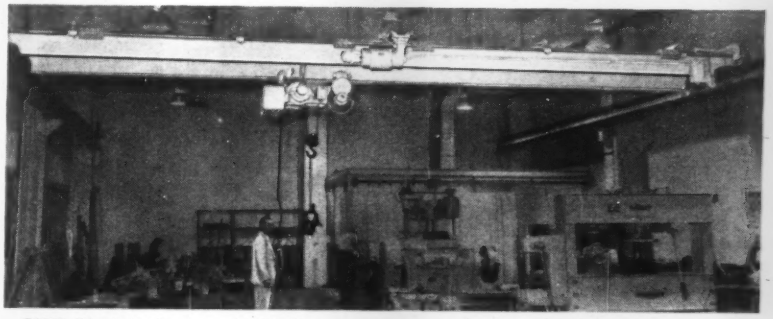

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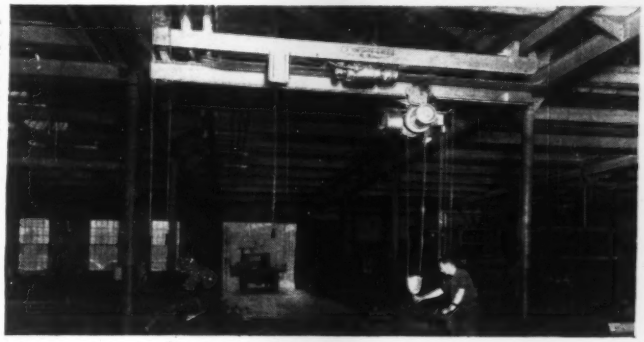

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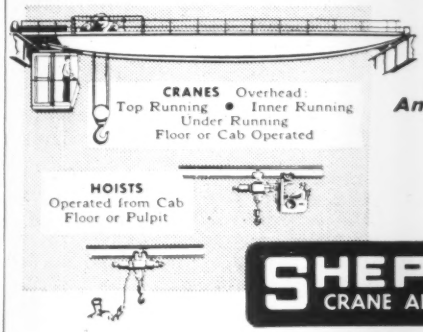

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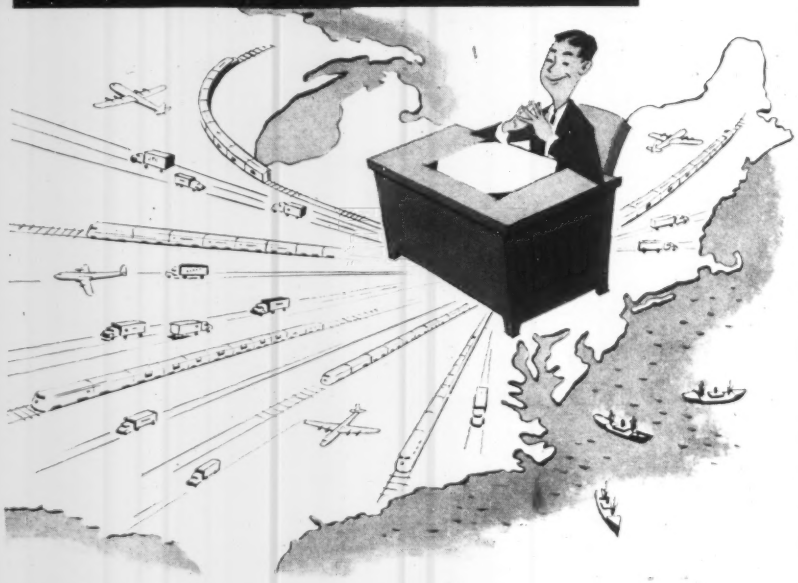

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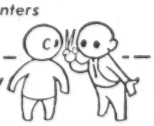

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for each unit because of the special problems involved.

Personnel Director George Parker reports that some 80 per cent of the New York City employees made the move. For some, the transportation problem was actually less severe than formerly, but even so the high over-all percentage was gratifying.

A year before construction started on Unit No. 1, Parker interviewed every employee, giving full information—on taxes, schools, churches, and the like—about the new community.

"It wasn't an open-and-shut case," he reports. "We gave ample notice of our intentions to the personnel involved, and our step-by-step transition, with an employee 'thinking-it-over' period, paid off."

If an employee agreed to come to the new plant for 30 days, then decided to leave, he was to receive two weeks' separation allowance. Those who stayed were offered $200 against their moving costs. Although no commitments were made, every aid was given home-owners who wanted to sell their houses and move nearer to the new plant. In addition, the company's home-ownership loan plan helped to ease the problem of moving for a number of employees.

"Pre-investigation into labor supply proved out in practice," says Parker. "Word of the attractiveness of the facilities got around, and the first time we ran an ad for help, we had to put extra chairs in our recruitment waiting room."

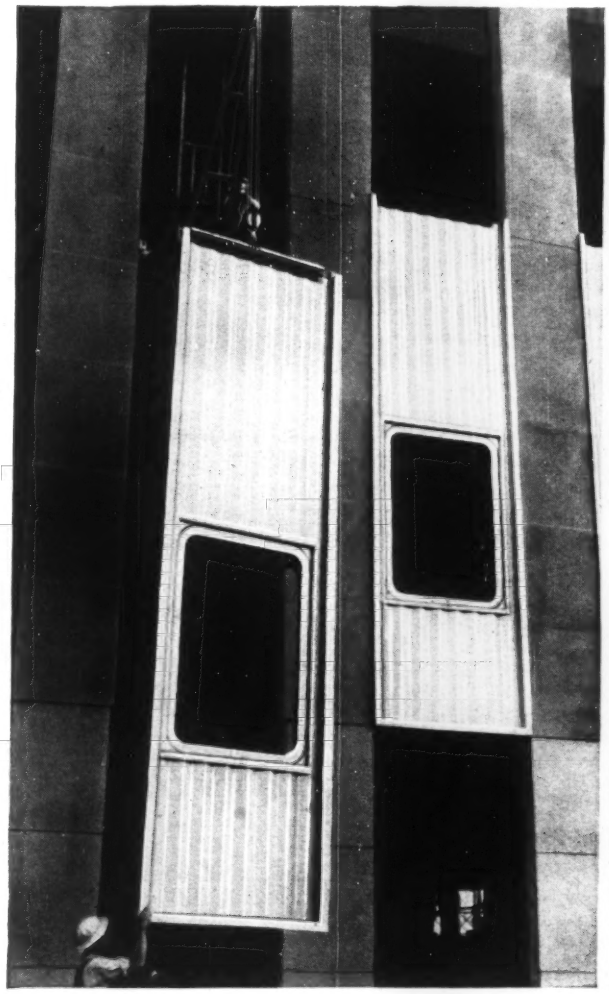
Scheduling the Move

The programmed expansion aided in the transition. Several hundred employees later destined for Unit No. 2 were moved into excess areas of Unit No. 1. When Unit No. 2 was ready, there was a cadre of experienced personnel on hand—especially important in view of the office automation program. Similarly, personnel destined for Unit No. 3 are currently occupying space in Unit No. 1. All equipment moves were made over week-ends.

Community acceptance is complete.

"We think so much of community relations," states Parker, "that we have now assigned a man to head it up full-time. We're active in the Bergen County Guidance Counseling Association, which uses our facilities. We have a Prentice-Hall Spelling Bee, pursue an active program of speaking before community groups, and the like. At our open house, when Unit No. 2 was opened, we had over 4,000 people here on one Sunday."

"Imagineering" in Action: Johnson & Johnson, page 85



Two modern ways to build well

There are good reasons why so many architects use structural steel frames and metal curtain-walls in modern structures like this Chicago skyscraper.

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The clear-span interiors are spacious, without a single column or truss to interfere with planning production layouts. Butler buildings also provide facilities for superior lighting, ventilation, and illumination—a better working environment.

They are economical to maintain and can be expanded quickly and economically whenever additional space is needed.

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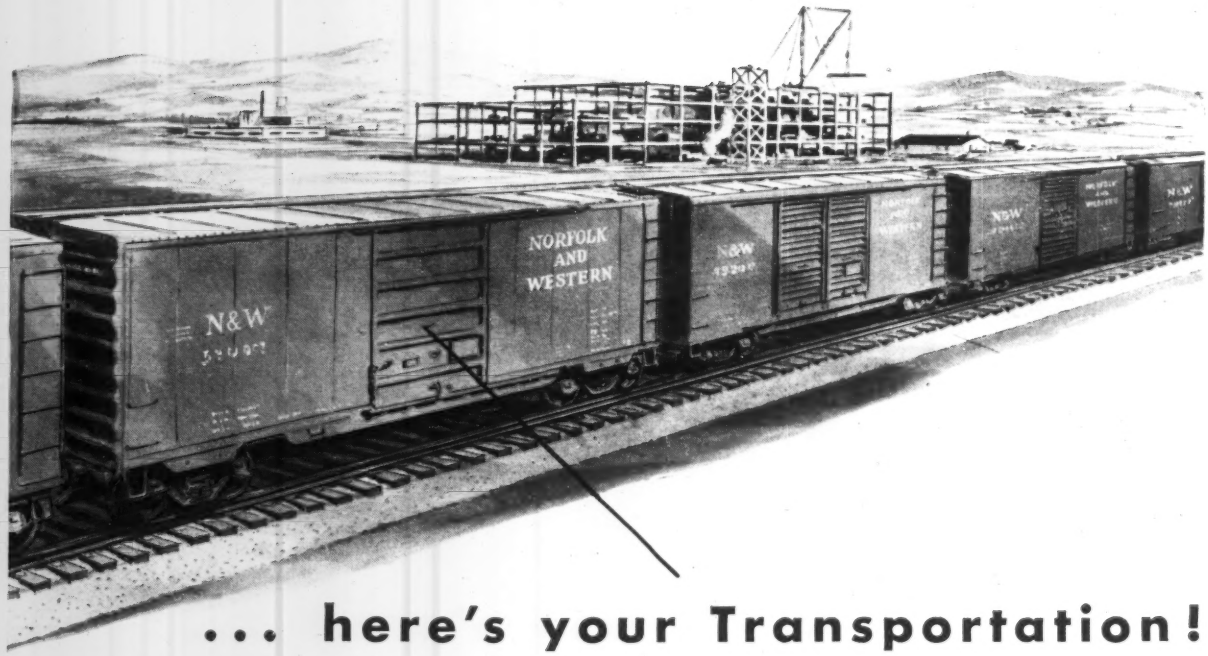

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HOW JOHNSON & JOHNSON ACHIEVED "CENTRALIZED DECENTRALIZATION"

WE SWORE THAT we would not be restricted by any preconceived notions." That, reports Johnson & Johnson, was the starting-point of their planning for the new, widely heralded Eastern Surgical Dressing plant at North Brunswick, N.J. The latest unit was put in operation last Fall (photo, page 111).

J&J's goal was decentralization of authority and responsibility without geographical decentralization. Four operations previously in separate locations in the New Brunswick area are combined in the new plant—Eastern Shipping Center, Baby Products, Orthopedic Products, and the Adhesive Plant and Plaster Mill.

"We didn't know whether we'd end up with one, two, or five buildings," says Production Manager J. H. Stamp. "While J&J is committed to maximum autonomy in operations, we didn't start out with the idea of retaining the same number of individual set-ups. As a matter of fact, we did combine two major units, Orthopedic and Baby Products."

Who Did the Planning?

Intensive planning began in April 1954, when management gave the go-ahead signal. The top planning group was composed of the managers of each of the four units, the production manager to whom they report, the head of the division's project engineering department, and a representative from the accounting department. All were coordinated by L. J. Bardsley, J&J's director of customer service. Bardsley also acted as liaison with Walter Kidde Constructors, whose engineers participated in all planning.

"All operations of all four plants were broken down into their smallest independent elements," explained Stamp, "and then all were examined to see how they related to one another and what would be the best way to fit the pieces back together.

"Here were our broad criteria: (1) Each unit finally chosen as an autonomous operation had to have room for two-way expansion with minimum dislocation; (2) units had to be related for best materials handling; and (3) we had to provide for the next step in our larger program—adding the gauze and cotton plants now in New Brunswick."

The two manufacturing units have their own separate offices and control laboratories in the connecting links between the buildings. Their managements, together with the shipping center, share maintenance and service facilities. Although the three units have separate auxiliary lunchroom facilities, there is a central cafeteria in a building of its own.

Built-In Expansion

How much "elbow-room" was put into the present plant? Surprisingly, Stamp reports that the facilities were built to fit foreseeable demands only through 1959. "That may seem short," he said, "but (a) we have built-in expansion, and (b) experience has taught us that as we move from hand to semi-automatic to automatic operations, our facilities requirements change so drastically that we can increase production and often at the same time decrease pro rata production space. In addition, increased volume often permits better planning and scheduling and better warehousing arrangements, with consequent savings in space needs."

The choice of this location for this particular plant ties in with a long-range program for new buildings to house all of J&J's administrative and professional personnel and this division's gauze and cotton plant, according to a master plan. The company had long thought about purchasing land in the general area where it finally put together parcels for the 300-acre site. However, its programing had to wait, among other things, for the area to acquire utilities, transportation, and the like. So when the Baby Products plant and the Shipping Center were built in nearby Cranford and Edison Townships, respectively, they were constructed with resale value in mind.

"Imagineering" in Action: Procter & Gamble, page 87

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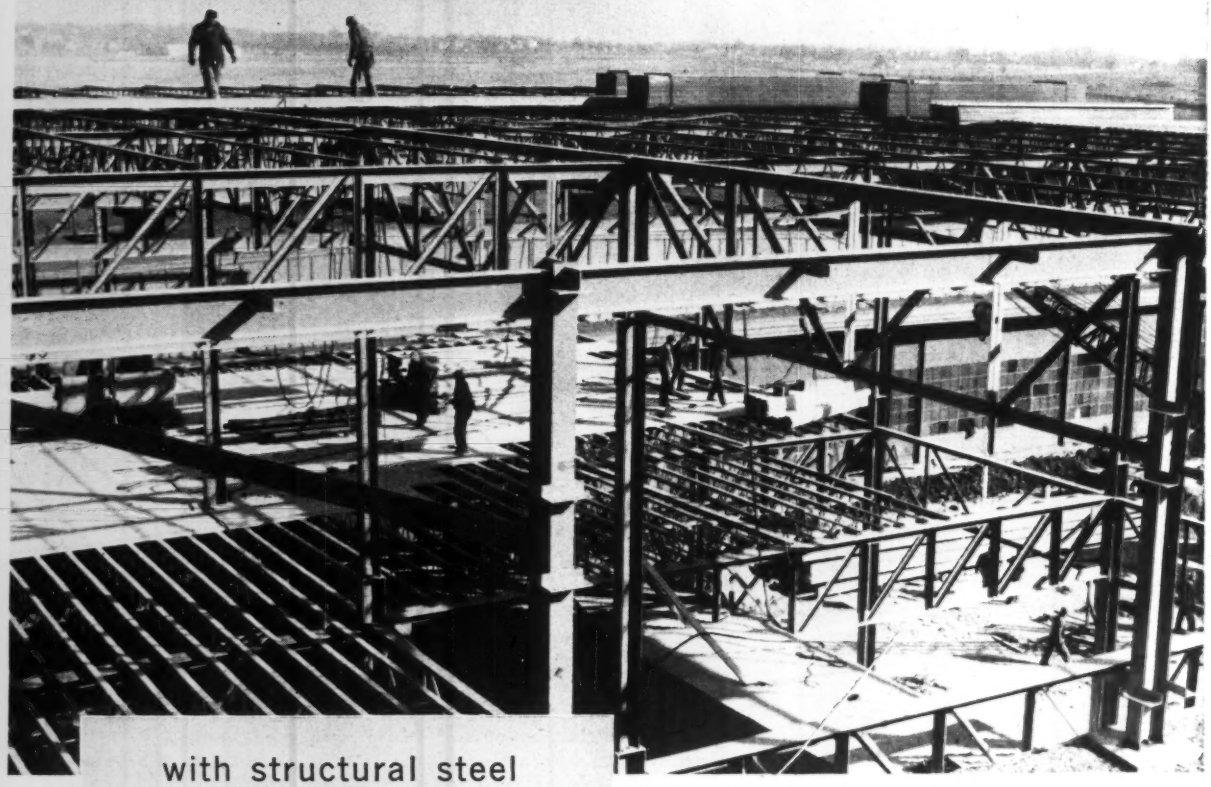

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Increasing sales of appliances made it necessary for Whirlpool Corporation to expand manufacturing facilities in Evansville, Indiana, fast to meet the growing demand. Traylor Bros., Inc. was selected as the contractor for this large construction project. They in turn called on International Steel for fabrication of structural steel for the new facility . . . because they knew from experience gained on other projects that International Service would keep them on schedule.

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International Service is available for special structural steel engineering, fabrication and erection on your construction project . . . wherever it may be. Write for data on facilities.

INTERNATIONAL SERVICE

INTERNATIONAL STEEL COMPANY

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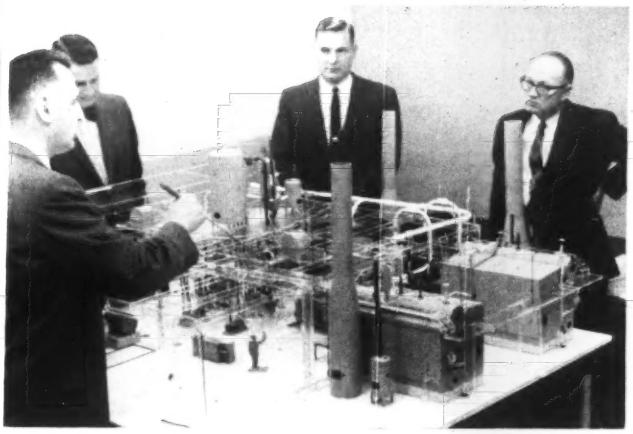
"Imagineering" in Action

HOW PROCTER & GAMBLE BRINGS PLANS TO LIFE



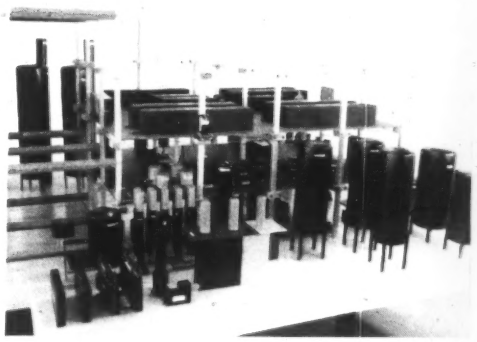
Procter & Gamble engineers discuss new-plant operations with three-dimensional model for illustration of boiler installation.

PROCTER & GAMBLE Company, which spends several million dollars a year on new plants and expansion of existing ones, makes extensive use of modeling and photography as "imagineering" aids. P&G engineers use three-dimensional visualizations to help define the scope of a project, obtain management approval, and convey the design intent to those who will actually construct the job. Use of photography with the models reduces the number and complexity of drawings—at estimated savings of more than $30,000 on a million-dollar project. For example, conventional complicated orthographic piping drawings are now replaced by prefabrication flat sketches made in the field directly from the approved model.

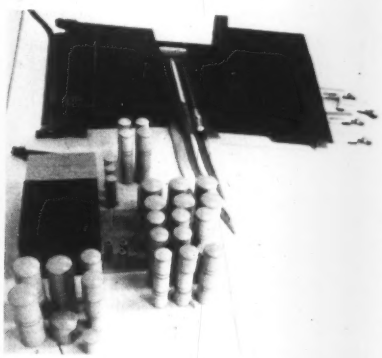
Standard procedure is to photograph the model and make screened positive transparencies on which dimensions and instructions can be added. Prints can then be made by either diazo or blueprint.

Photography has also brought significant economies in revisions of existing facilities. Instead of sending engineers and draftsmen to the site, photo drawings, with instructions on the transparencies, show construction forces what to do.

"Imagineering" in Action: Lincoln Electric page 89



In this model for preliminary arrangement of equipment, floors are adjustable or removable, and pins in base allow bay sizes to be changed. P&G places all possible production equipment outside of buildings.



A pilot plan model is used during the fundamental engineering phase to work out the best arrangement. Design information is scarce at this stage of the planning. Use of blocks keeps the representation simple.

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DR-48

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Firm Name _____

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"Imagineering" in Action

HOW LINCOLN ELECTRIC AVOIDED "GROWING PAINS"

"IMAGINEERING" has paid off at the Lincoln Electric Company's plant in Cleveland, originally erected in 1951. Experience has borne out the projected savings in indirect labor made possible by the building design.

Last year's sales, over $60 million, were almost double 1951's. Early this year, operations began in an addition that expanded the plant area 50 per cent. This stretch-out was also as planned. Aluminum curtain walls at either end of the plant, designed for maximum salvage, were readily knocked out for the additional bays. The original concept of layout and material flow has not been changed. Total area is now approximately 1.2 million square feet.

"Over two years of planning went into the original layout, and another two years into the building," reports Lincoln. "The increased dollar volume reflects doubling of real output, with only about a 30 per cent increase in employment."

Since Lincoln's incentive system had already achieved high direct-labor output, management's major objective in designing its new plant was maximum elimination of indirect labor. In the old plant, insufficient space for duplicate machines and storage after long runs resulted in too much moving of materials and added up to excessive set-up costs. Accordingly, the design teams aimed at unobstructed floors for most economical assembly lanes and unobstructed height for most economical materials-handling equipment. (Overhead handling, according to the Austin Company, builders, has brought about a 20 per cent saving in floor space.) The result is, in effect, "a big stock room with manufacturing space right next to the stock" (diagram below).

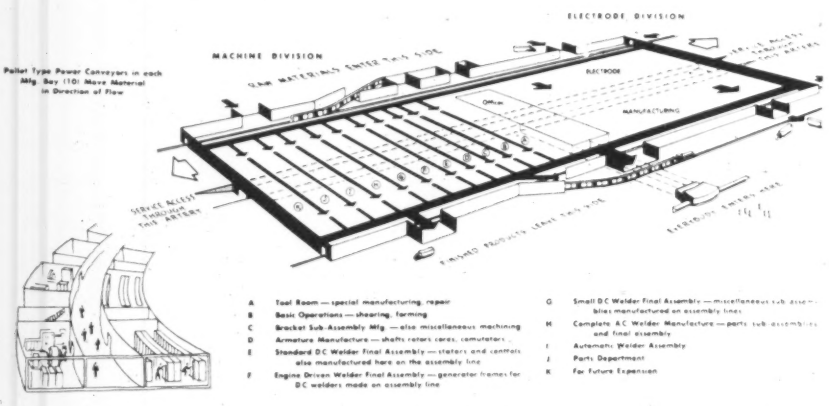
A novel feature is the tunnel that runs the entire length of the plant, with stairwell access to the bays overhead. This keeps all toilet, locker room, and pedestrian traffic off the manufacturing floor.

All personnel enter the plant through a connecting access tunnel, protected from truck and rail traffic, which travels completely around the perimeter of the plant. With perimeter access, supplies can be brought with minimum handling anywhere on the manufacturing floor.

Further expansion in the office will be possible on the second floor, in space now used for storage. The office itself is unusual. It is located in a two-story structure (which also houses the engineering department and laboratory) inside the main building, providing maximum accessibility and cutting lost time.

"Our indirect labor savings have been substantial," reports William Irrgang, Lincoln's president. "For example, we used to have an inspection staff of some 45 men. Since our layout now permits inspection at the machines, inspectors have been reduced to seventeen—with our expanded operations absorbing these and others released. With stocks at point of use, visual inventory control eliminated the expense of inaccurate records."

Pinpointing Plant Location, page 90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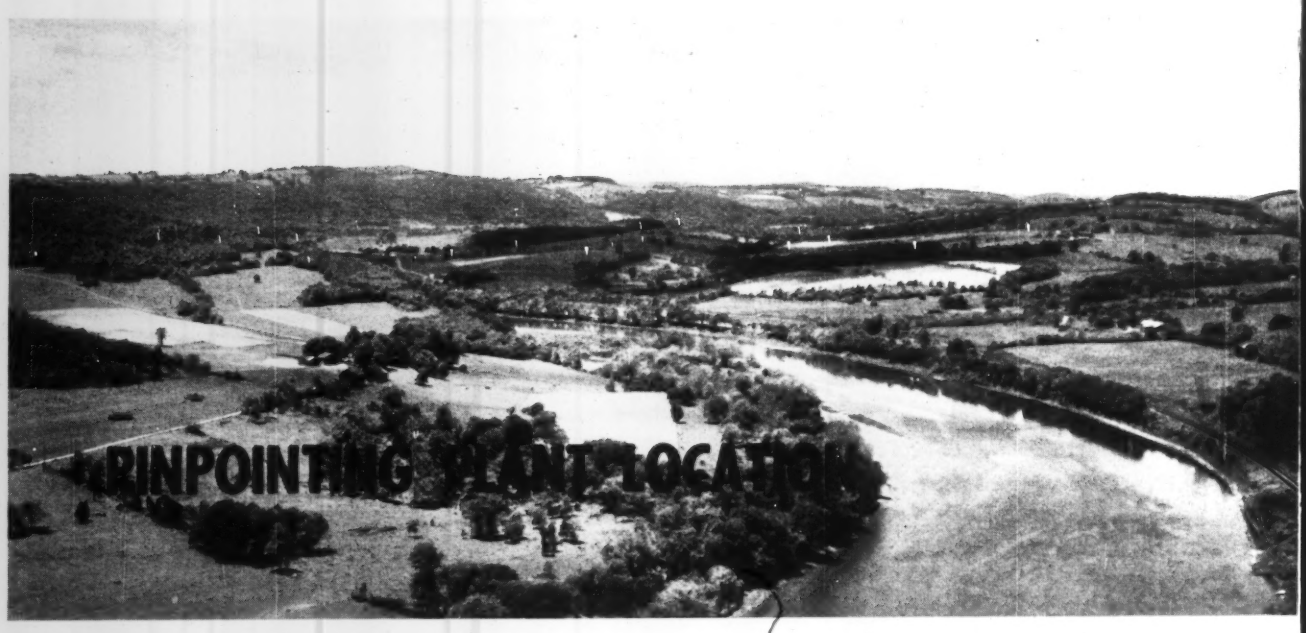
E Standard DC Welder Final Assembly — stators and controls also manufactured here on the assembly line
F Engine Driven Welder Final Assembly — generator frames for DC welders made on assembly line
G Small DC Welder Final Assembly — miscellaneous sub assemblies manufactured on assembly lines
H Complete A.C. Welder Manufacture — parts sub assemblies and final assembly
I Automatic Welder Assembly
J Parts Department
K For Future Expansion



This article was prepared by a DR&MI panel under the direction of

LEONARD C. YASEEN
Senior Partner
FANTUS FACTORY LOCATING SERVICE, NEW YORK
with

G. E. GARNHART
Director, Real Estate & Insurance
WESTINGHOUSE ELECTRIC CORP., PITTSBURGH

LOREN C. TRIMBLE
Manager, Industrial Development
COMMONWEALTH EDISON COMPANY, CHICAGO

and the staff of DR&MI

THROUGH THE USE OF more efficient physical facilities and operating methods, American industry will continue to cut costs by millions of dollars. But the executive who has the need—or the opportunity—to start with a clean slate in new manufacturing facilities will find that perhaps the greatest single cost variable within his power to control is industrial geography.

In many industries, location can account for a differential of as much as 10 per cent of total costs, as shown in numerous area-development surveys and confirmed by studies of more than 1,500 plant locations by the Fantus Factory Locating Service.

It is not far-fetched to assume that a company with a total cost of goods sold of $10 million could save, or lose, $1 million a year, every year, solely by virtue of geography. Many a competitive also-ran has found that such a cost disparity can exist between companies in the same industry, both using the same general engineering, production, and sales techniques.

Many companies, it is true, examined the geographical alignment of their plants and warehouses when they were built. But, the advantages of a location must be reassessed periodically. Too often, executives are unaware of the cumulative year-to-year changes that may make further expansion in a location highly disadvantageous.

Because so many tangible and intangible factors are involved, the total impact of these changes is often underestimated. Renegotiated labor contracts, upgraded job evaluations, added holidays, more built-in seniority, increased local and state tax assessments, shifting markets and hence skyrocketing freight costs, high labor turnover, and plant obsolescence can radically alter a company's inherent cost structure in a comparatively few years.

These changes in balance of costs have resulted in a wave of decentralization, with consequent problems of branch plant location. Of all new plants built since 1950, only 4 per cent were constructed in traditional manufacturing centers. By 1970, nearly 35 per cent of our total population will live west of the Mississippi River, compared with about 30 per cent in 1950. Industrial employment will decline proportionately in the Middle Atlantic and New England states.

In view of these dramatic shifts in purchasing power and supply sources, many manufacturers will face locational problems whether they want to or not. And at that time, relocation or expansion by "intuition" could prove fatal, for the decision may involve the very success of the company.

Who then should be charged with the major responsibility for this decision? The multiplicity of problems, the evaluation of contradictory and conflicting data, the final fusing of tangible and intangible factors demand the most mature business judgment.

In the smaller company, where a new plant may be required once in a decade or more, the president should probably take an active part in solving the location problem. But in large companies, those that are constantly expanding and have many operating divisions, the president cannot become actively involved. In these cases, the head of the operating division, the man who will be responsible for the profits earned by the proposed new plant, should be assigned the primary responsibility for justifying the selection of a location.

One reason for handling the problem

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Soon to be completed for Edgar's Warehouses, Inc. is this new single story Public Dry Merchandise Storage Warehouse covering 225,080 sq. ft. in Toledo, Ohio. It is an all steel frame and masonry building, docked for railroad and trucking . . . completely sprinklerized.

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Sign of Integrity

at high managerial levels is the desirability of secrecy, which helps to minimize labor and other repercussions. Also secrecy permits management to weigh objectively the claims of community, state, regional, railroad, construction, and real estate representatives.

Occasionally the most elaborate precautions to maintain secrecy fail because of the bitter competition between areas vying for new payrolls. A large chemical company assigned code names to all executives in the company. Correspondence was handled through attorneys. Despite these attempts at secrecy, real estate brokers in the chosen community discovered the company's identity and the true names of all executives. In renting a car, the president was required to show his driver's license. State police were helpful in tracing the license tag to the rental agency and then to the rental receipt.

Rationalization vs. Fact

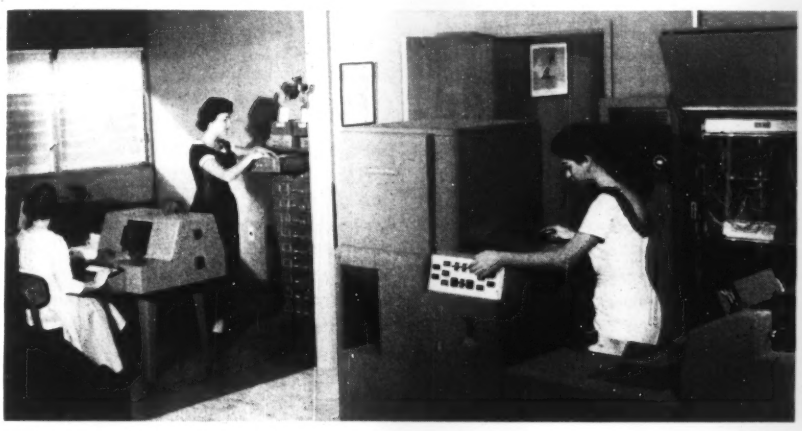
Even after a study is launched, major stumbling blocks are sometimes encountered *within* the company. Very often no one but the president can bridge the gap between rationalization and the facts. For example:

- **Rationalization:** "Other companies can move, but we must depend upon skilled labor available only at our present location."
- **The facts:** Entire industries have migrated from traditional centers to areas possessing no developed skills—with a net increase in productivity. Most "skills" can be broken down into a group of related "semi-skills." Many highly integrated products can be re-engineered to simplify and reduce specialized labor requirements.
- **Rationalization:** "Our factory is completely depreciated, and occupancy costs in a modern plant would be too burdensome."
- **The facts:** Complete depreciation is usually synonymous with obsolescence. Higher rental costs of a new structure may be insignificant compared to waste involved in operating interconnected, cut-up, multi-story buildings and sheds on an inadequate site in a congested urban area. It is not unusual to find that only 80 per cent as much space is required to turn out equivalent production in a one-story, streamlined structure with modern materials-handling equipment and no layout problems.
- **Rationalization:** "A great many businesses are on the way down. Why don't we pick up one of these plants that are being thrown on the market?"
- **The facts:** An efficient plant is vital, but the right location should come first. And even when an existing structure is available in the right area, caution is advisable. Reconversion costs can be shocking. In general, most *locational* mistakes are made because of the "convenience" of a "bargain."

Honest assessment of the real problem may be difficult, but it is imperative. Close analysis of present costs, including the percentage relationship of labor, material, inbound freight, outbound freight, and utilities, is important.

Cost "input" factors vary widely among industries. For some, labor accounts for a relatively high proportion of final delivered-to-customer product costs. In others, assembly of raw materials, transportation to ultimate consumers, or cheap power and fuel are the determining factors.

"There is a big difference between



A "tomorrow-type" service is offered by this centralized Univac computing set-up. It was established to provide electronic and scientific enterprises in the Westbury Industrial Park (Long Island, N.Y.) and vicinity with convenient and extensive accounting and engineering computation services. Scientific Tabulating Corp., which runs the service, says it's a "first."

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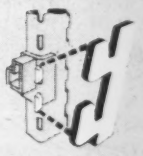

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1. The Floating Wedge is inserted into the . . .
2. . . . slots in the prefabricated upright frame and . . .
3. . . . locks to the horizontal safety support bars.

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operating a plant in a friendly atmosphere and operating it in an atmosphere of antagonism and misunderstanding. It makes a difference whether the people of the town really want you there," says William Rockwell, Jr., president of the Rockwell Manufacturing Company.

In decisions to locate Rockwell plants at Porterville, Calif., Sulphur Springs, Texas, Kearney, Neb., Tupelo, Miss., and Russellville, Ky., labor stability and local attitudes were primary factors.

Wage rates are important, but labor climate, of course, has a bearing on absenteeism, productivity, and turnover rates. One of the nation's largest metalworking companies, with eighteen plants throughout the country, recently stated: "Our labor turnover in small towns is less than half our personnel replacements in large cities. There are fewer job opportunities and big-city distractions, and less time and effort are spent traveling to and from work. As a result, our employees work more happily and more productively."

With job opportunities for women remaining at a high level, women will continue to be a recruitment problem, even though one of every four married women is now in the labor force.

In any location, the recruiting of women between the ages of 18 and 35 will be complicated by (1) the relatively small number of women in the 18-to-35 age group, a consequence of the low birth rate in the 1930's; (2) the trend to early marriages and large families.

Nation-wide, we may anticipate an increase of 5.4 million women in the labor force by 1965. However, most of these women will be in the very young or older age groups. Little gain is anticipated in the 25-to-34 age group, for most of these women will be occupied with raising children and keeping house. The 35-to-44 age group in the workforce is expected to increase by nearly one million. Significantly, the greatest increase will occur in the 45-and-older group, involving some 2.6 million women during the next nine years.

Selectivity in the recruitment of female labor is only possible in an area where men are not predominantly employed at highest skilled rates, and where supplementary income is actively sought. In addition, hiring older workers must be seriously considered.

Labor Rates and Skills

Almost without exception, labor costs for identical job classifications are higher in large cities than in smaller communities. This is true regardless of regional differentials. For example, during a recent period, average weekly earnings in the state of California were $93.14, *including* earnings in large cities. Sacramento, however, showed average weekly earnings during the same period of $105.28. Average weekly earnings in New York State were $82.49, as compared to Albany's $91.49, Buffalo's $97.99, and Rochester's $88.98.

Regional differentials are well known. But the question is often asked: Will they continue? The answer is "yes." In fact, they are increasing. In the Southeast, for example, North Carolina shows average weekly earnings of $55.95, as compared to $95.37 in Ohio, $101.36 in Michigan, and $91.93 in Indiana—or percentage differentials of 70.5 per cent, 81.2 per cent, and 64.3 per cent, respectively.

Peering ahead, it would seem that in the next decade our labor force will increase, and its characteristics will change as manufacturing processes become more mechanized. The number of production employees per unit of output will probably continue to decrease. At the same time, job requirements are becoming more complex.

As the semi-skilled worker becomes less important, many manufacturers will probably find that machinery maintenance men, electricians, tool and die makers, and so on will have greater significance in their plans for mechanized or automated operations. Even now, a good supervisor not only must be a good mechanic but must also have a good understanding of cost-accounting systems, data processing, job evaluation, shop budgets, material control systems, labor contracts, and so on.

In addition to the problems of selection, training, and upgrading that this trend implies, employers considering new locations will in the future find it necessary to put more emphasis on community environment. This becomes increasingly important when a large number of skilled workers must be transferred or recruited.

In the radio-television industry, electronic technicians are an increasingly important new skilled category. Although as a group they seem to make more than the average number of job changes, they require a much greater stimulus to make them move from one area to another than from one job to another within an area. One radio-television assembly plant recently located in a community where all costs appeared to be remarkably low. Nevertheless, the community turned out to be an unsatisfactory location for the new plant because the company could not attract electronic technicians or other engineers to it. Many of the amenities—social, cultural, educational—were lacking.

Transportation and Marketing

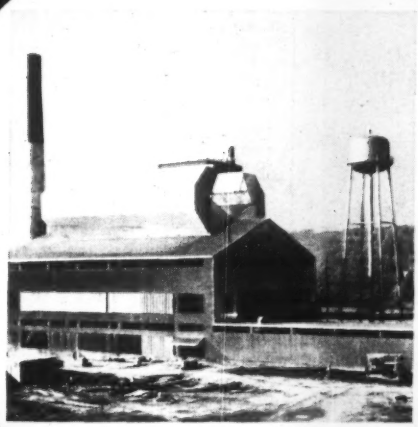
Countless manufacturers are today faced with a brand-new problem—the skyrocketing cost of moving finished products to customers. For producers of consumer goods, freight rates have increased over 170 per cent since 1946. In addition, the shifting U.S. population has created major new markets far from traditional manufacturing centers. Los Angeles County, for example, has increased annual retail sales by $3 billion, or over 150 per cent, in the past decade.

Producers of industrial goods find that decentralization of manufacturing has drastically altered their distribution patterns. Wichita, Kan., an agricultural trade center before the war, has developed into an important producer of transportation equipment. A phenomenal growth is taking place in chemical production along the Ohio River, in the lower Mississippi Valley, and on the Texas Gulf Coast.

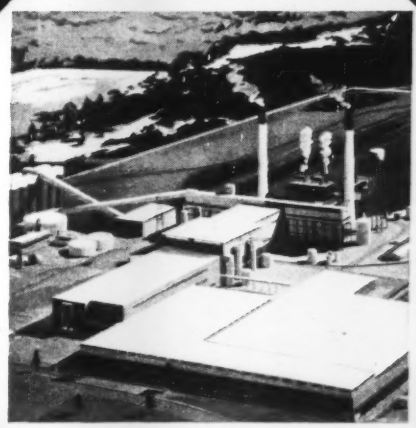
Distribution problems are becoming more and more perplexing. Should regional production plants or service warehouses be established? At what location can transportation costs of raw materials and finished products be minimized? How can competitors' favorable marketing position be equalized? How can warehousing costs be held down?

Manufacturers seeking to serve a national market at lowest cost should locate at a point near their center of markets. Actual experience indicates that savings of at least 10 per cent in outbound

THE AUTHOR • An authority on plant location, Leonard C. Yaseen has advised more than 1,500 companies in all kinds of industries on the selection of sites for new plants. A senior partner of Fantus Factory Locating Service, he has recently formed an affiliate company, Fantus Area Research, Inc., for the compilation of scientific studies on areas and the preparation of programs for their industrial development. Mr. Yaseen is the author of *Plant Location*, a standard text published by the American Research Council.



Glass Plant
Owens-Corning Fiberglas Corporation



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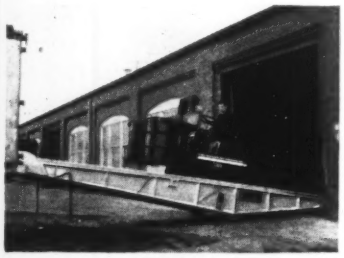


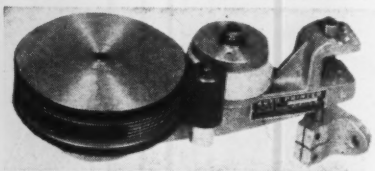
Write for Bulletin DB-211

MAGLINE INC., P. O. BOX 134, PINCONNING, MICH.

Canadian Factory: Magline of Canada Ltd., Renfrew, Ont.

Magliner Mobile Loading Ramps

THE "WHIPPET" MARKER



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freight costs may be achieved in this manner. Location at the center of markets yields the shortest total distance, lowest average freight costs, and minimum delivery time to more customers.

From a transport standpoint, whether a manufacturing plant locates close to raw materials rather than markets is primarily a question of: (1) rates on raw materials as compared with movements of the finished product; (2) extent of weight loss in the manufacturing process (if great, a location near the supply would be indicated); (3) amount of unmarketable by-products or scrap; and (4) quantity of fuel consumed.

Historically, most industries requiring heavy movement of raw materials have been established near the source. Today, however, changes in marketing patterns and freight-rate levels are also influencing the location of heavy industries. Steel is now manufactured economically at the source of coal, at the market, and at intermediate points where neither raw materials nor markets are present.

Changing relationships between raw material assembly costs and delivery charges on glass containers have encouraged establishment of modern glass plants close to markets rather than glass-sand deposits. This change also reflects the increased efficiency of long-distance pipeline transportation of gas, the glass-making fuel.

Tax Considerations

State business taxes can be potential obstacles. For a multi-state business, the apportionment formula and allowable deductions may be more important than the rates themselves. Frequently, the formula comprises (1) tangible property, (2) payroll, and (3) sales or receipts.

In plant location decisions, two of these factors, property and payroll, can be held constant throughout comparative calculations. However, the *sales* numerator varies with definition. Depending upon the wording of the statute, taxable business may be sales to in-state destinations, sales made from inventories in the state, sales negotiated by personnel operating from in-state offices, and so on.

Some states permit the deduction of Federal tax before calculation for the state tax—effectively reducing the rate by 52 per cent. In other states, the single factor of sales within the state is used to determine direct income tax liability.

Many states impose a sales and use tax (averaging 3 per cent). There are important differences in its application,

however, since some of these states specifically exempt machinery, fuel, interstate sales, raw materials to be used in manufacturing, and or factory supplies.

There is considerable variation in workmen's compensation insurance rates and in unemployment compensation costs. A manufacturer of nonferrous castings in New York State, for example, would pay $3.80 insurance for every $100 of payroll. A similar manufacturer would be liable for only $1.51 per $100 in Indiana.

While real estate is subject to local taxation everywhere, all states do not tax *personal* property of manufacturers. Other things being equal, it is preferable to locate the new plant in a state that does not tax personal property, but if this is impossible, it is essential to look into assessments. Some states assess personal property on the basis of its value as of a specific date. Others use average values for the calendar or fiscal year.

Actually, with local taxes the important consideration is the *effective* tax rate —that is, the assessed value times the rate of tax. In investigations of real estate property tax, a series of questions should be asked: (1) What is the tax philosophy of local political leaders as it affects property? (2) Is full value assessment utilized or some other policy? (3) How efficient are the assessors? (4) What is the taxing policy with respect to plant machinery?

Specific Site Selection

After careful surveys and evaluations have indicated the general area for locating a new plant, there remains the choice of community and site.

When a concern locates outside an industrial center, it must in effect go into the real estate business. It recognizes that by its act of location real estate values are enhanced. Therefore, considerable profit may accrue to a company that acquires additional acreage. This is also the only practical means of determining who will occupy the neighboring land.

Switching facilities and accessibility to more than one railway may be important considerations. In this connection, while many plants today do not use rail as part of their distribution and supply systems, it is well to keep the consideration of resale value in mind. Resale can usually be more readily accomplished with track.

Preliminary engineering reports on sites are a "must." Strangely enough, they are often overlooked. Is the contour of the site such that a minimum of grading or other treatment will be required? Is the site elevation sufficient to avoid

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any possibility of flooding? What are the subsoil characteristics? Will heavy costs for foundation, piling, or drainage be encountered?

With industry's trend to locate outside suburban areas, the lack of proper storm water and sanitary disposal facilities has created peculiar problems, especially in small communities. These problems can be solved, but the cost is often surprising.

Points of identification within a city are often sought—location near an airport, in an attractive section, or where the "name" or advertising value is good. These need careful sifting, especially for personal predilections of key executives.

Planned industrial districts, subdivided and promoted for manufacturing and warehousing operations, have been springing up throughout the country. Prior to 1940, only 24 districts had been developed. Today the number of these projects is estimated at over 4,000, although of these perhaps only about 500 are significant in size and services.

Advantages to Industry

In older manufacturing centers, industry is plagued by traffic congestion, lack of parking facilities, and cramped sites. The trend toward functionally designed, one-story plants, coupled with the desire to avoid congestion, has directed attention to planned industrial districts. Managements, especially of smaller companies, are generally reluctant to develop "raw" sites, which may involve long rezoning procedures and costly extensions of utilities. In the industrial districts, all necessary facilities are in place prior to construction of the plant, and favorable zoning and parking areas have been arranged. Moreover, covenants prevent construction of poorly designed buildings and restrict undesirable neighbors.

The typical occupant of an industrial district is a manufacturer or distributor who needs a small-to-medium manufacturing shop, service center, warehouse, repair shop, or the like.

Centralized services, like building maintenance, medical facilities, even (more recently) central computing, are often attractive to a small company or a small unit of a large corporation.

Unquestionably, the availability of risk capital for a "package," or "turnkey" type of facility, has also been an important factor in the growth of industrial parks.

Occupants of a district often find strikes and labor problems contagious, and it is difficult to establish wage patterns consistent with the needs of individual industries. National firms erecting warehouses in these districts seldom study local wage patterns, since only a few workers will be hired, and tend to offer warehouse employees the same hourly rates as those paid in the main plant in some other city. Collectively, these higher wage rates may have a disruptive influence.

In order to "pay out," developers of the park must usually insist upon a high ratio of land coverage. The initial plant generally covers about 60 per cent of the lot, and options on vacant land for expansion are usually for a short period.

One of the major disadvantages is the high cost of occupancy. Developers tend to install roads and utility lines according to city specifications so that they may ultimately be deeded to the municipality. A company improving its own site would not attempt to meet these standards.

In many cases, industrial districts have introduced problems of traffic. Planning *within* the district may be excellent, but when all occupants close at the same time of day, the frequent result is vehicular congestion at main intersections, with traffic back-ups inside the district.

This Century's Problem of Water
page 98

Latest in the series of plants built by Wigton-Abbott Corporation is this ultra-modern eight-acre streamlined building for Continental Can Company at Sharonville, Ohio, near Cincinnati. All manufacturing equipment was also installed by Wigton-Abbott.

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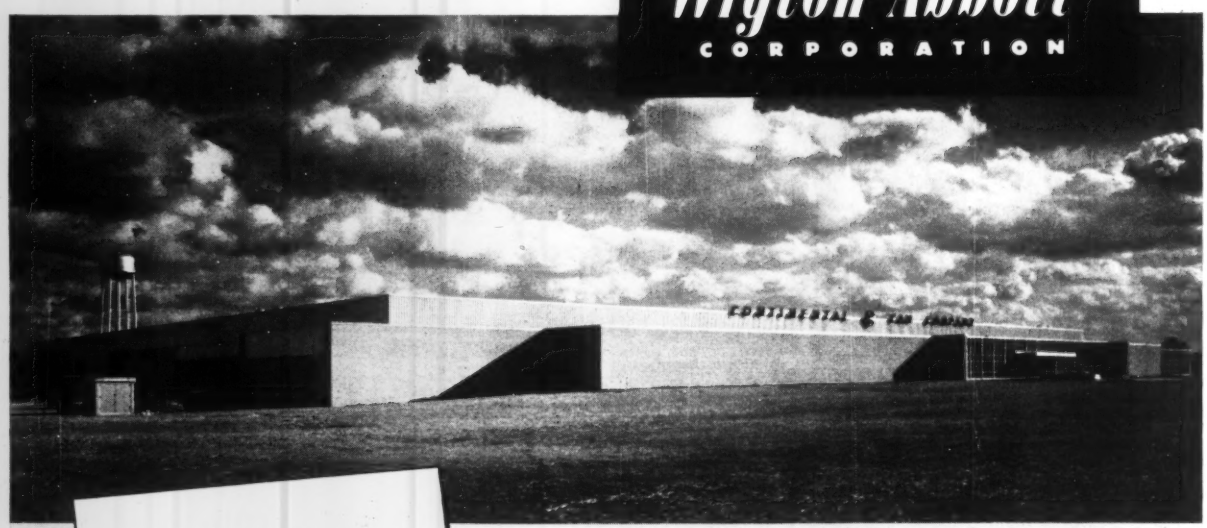

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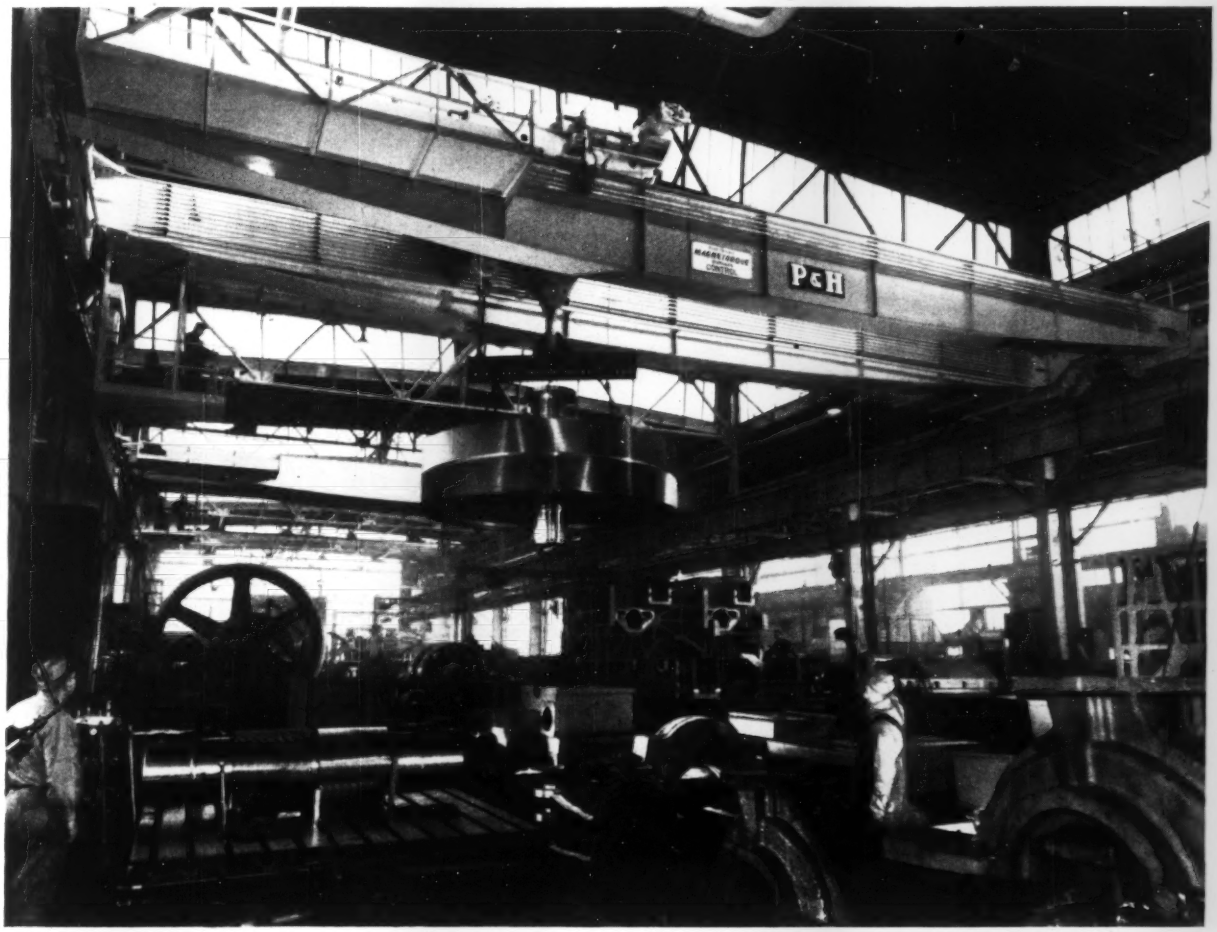

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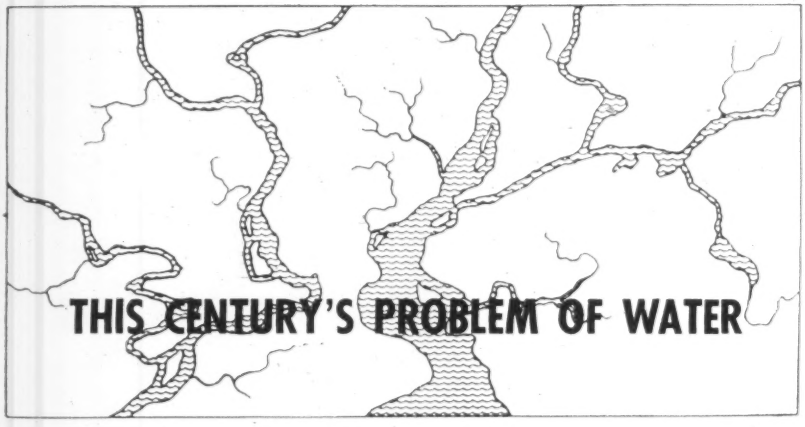


THIS CENTURY'S PROBLEM OF WATER

AMERICAN INDUSTRY has always tacitly assumed a ready availability of water. Yet water is one natural resource with which the United States is relatively badly supplied. And the water problem is now coming in for a good deal of attention, since almost every region has in recent years been affected by droughts, municipal water shortages, and continuing upswings in demand.

Once depleted, water tables are even more difficult to restore than eroded or depleted soil, and industry overbuilding in areas of marginal water supply invites disaster. If present trends continue, total water used in the United States will increase from the present level of about 262 billion gallons per day to over 450 billion gallons by 1975. In Texas, for example, water use has increased two and one-half times since 1940. Texas's much publicized seven-year drought sharply curtailed available supplies, and 75 per cent of the people in Texas were forced to restrict their use of water at one time or another.

Fortunately, many corrective plans are now under way. For even in the "moist" sections of the country, like northern New Jersey and northeastern Ohio, withdrawal is exceeding average net supply.

Spectacular plans are beginning to come off the drawing boards. Some of the projects are listed in the table below.

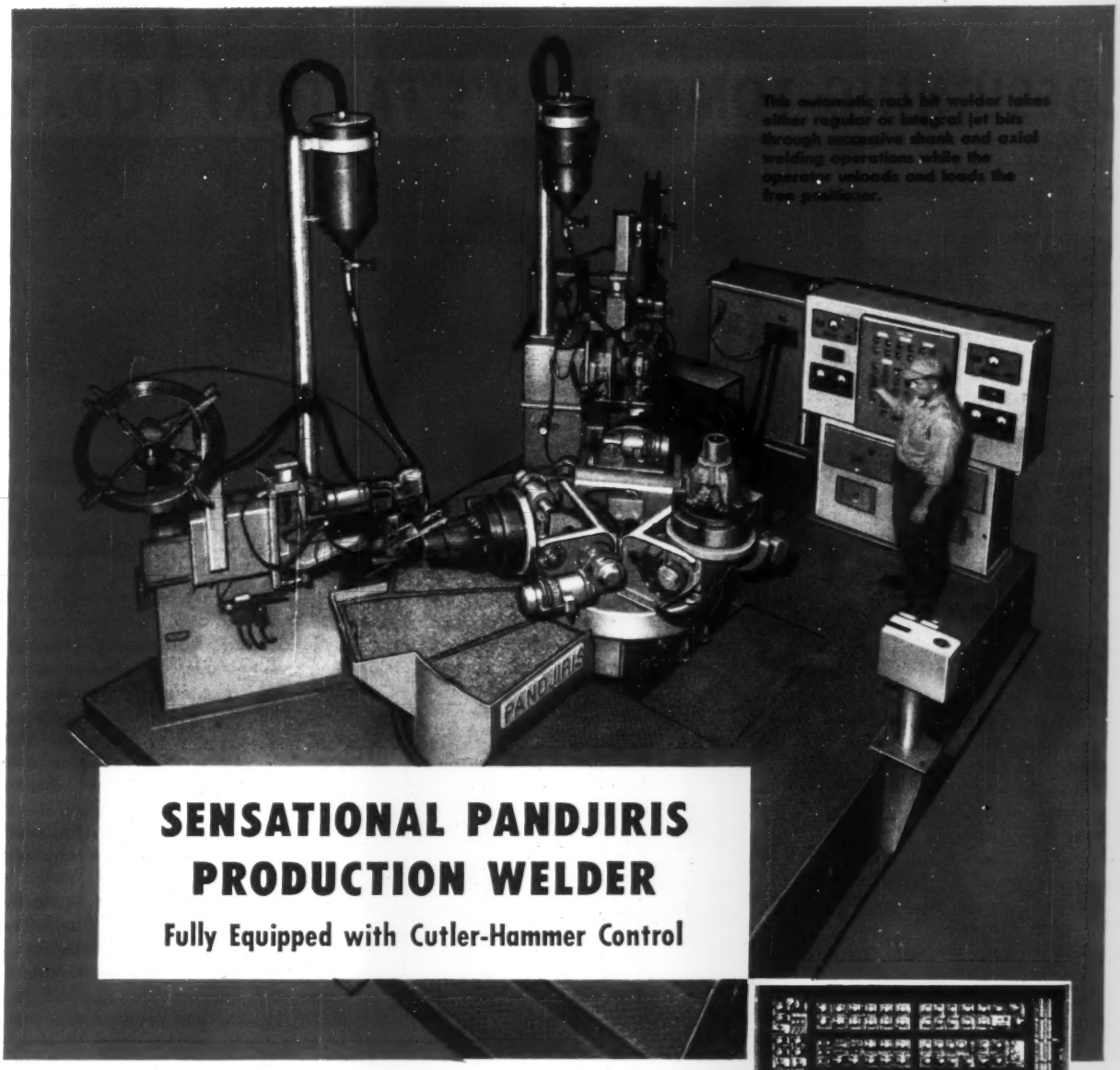
While these projects may appear ambitious, it is significant that one major program has already been completed. The $4.5 million Bushy Park project at Charleston, S.C., involved a 3.3-mile canal to divert the upstream Cooper River water into Back River. A dike across Back River to keep out salt water also had to be built. By reshuffling these two rivers, Charleston now has a large supply of fresh water, and it has opened a tract of land between the two streams for industrial sites.

Much will have to be done in the decades ahead. Before many of the needed projects can get off the ground, thorny problems of local, state, and Federal responsibility must be solved.

In any relocation or new location move, especially to a smaller community, management should look thoroughly into the future water supply situation as it relates to community plans for attracting new industries. In many cases, location experts point out, the communities themselves, in their enthusiasm for new industry, have failed to take the water problem fully into account and may be unable to deliver.

Designing Tomorrow's Factory Today
page 100

State	Project	Estimated Cost
CALIFORNIA	Aqueduct running full length of state	$12–13 billion
NEW JERSEY	Round Valley project	$670 million
OHIO	Diversion of water from Lake Erie through Cayuga River and canal	$256 million
OKLAHOMA	200-mile canal to Arkansas River	$200 million
RHODE ISLAND	Large water district	$14.4 million
TEXAS	Canal across state to intercept rivers	$1.1 billion



This automatic rock bit welder takes either regular or integral jet bits through successive shank and axial welding operations while the operator unloads and loads the free positioner.

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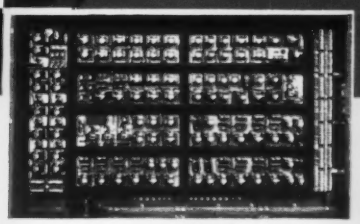

The electrical control cubicle contains all the Cutler-Hammer Three-Star Control components which control each machine motion.

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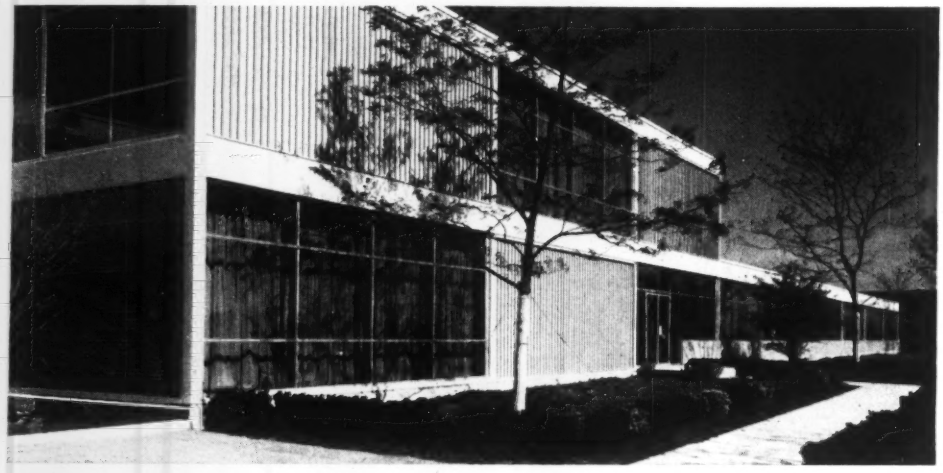

TODAY'S GLEAMING new factories —many of them, spacious multicolored structures in landscaped settings—are a far cry from the old, dingy brick buildings characteristic of our New England mill towns, where industrialization dates back to the seventeenth century. But the economic motivations are still the same —the manufacturing and marketing of a product. There is still the need for an enclosed space to accommodate machines and people. Sites are still selected for their proximity to raw materials, skilled workers, markets, and transportation facilities.

But today's production problems have become so complex that a host of specialists, ranging from real estate mortgage experts to highly trained engineering technologists, must participate in even the smaller industrial building projects. Difficulties unforeseen by our manufacturing forefathers now require ingenious solutions. For example, certain industrial areas in the Eastern United States have become so overcrowded that ground water for manufacturing use must be stringently rationed. This factor alone has necessitated important refinements in process piping. And developments in power and mechanization, increasingly rapid technological progress in every industry, and the constantly growing need to consider the human factors of production have done much to transform the factory from a shell to a complicated machine in its own right.

This article was prepared by a DR&MI panel under the direction of

ALBERT KENNERLY, A.I.A.
Associate Partner
SKIDMORE, OWINGS & MERRILL
with
JOHN HENNESSY, JR.
SYSKA & HENNESSY, INC., NEW YORK
HENRY HOFELDT
Partner
WEISKOPF & PICKWORTH, NEW YORK
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Construction of a modern industrial plant calls for a technological team. Outside experts—the land specialist, the architect, and the engineer—should work closely with management's own staff to establish the framework of present and future location and land-use planning. Conclusions reached during the pre-programing, fact-finding, and fact-interpreting phase help set the stage for future company policies and contribute to orderly growth and expansion.

It is assumed, of course, that the team's work has been preceded by studies of economic forecasts, production processes and equipment, handling, labor availability, distribution, financing, and related factors. Management requirements can then be translated into terms of space and the mechanical servicing of that space.

For facilities programing, management usually finds it convenient to establish a small committee. Ideally, this committee includes the company's directors of production, maintenance, and personnel. Where large clerical or other extensive office functions are included in the project, the office manager should also serve. And management has much to gain by having its architect-engineers on the committee.

To develop programing in detail, the simple device of distributing questionnaires to department heads is often used. The results are specific local requirements for machine, bench, and employee stations and departmental manpower, space, and location. These can then be projected by the planning group not only for the day when the new facility is to be ready for occupancy, but for the next five or ten years, taking into account storage, plant services, and the like. Modify these data in accordance with budget limitations, desired above-minimum provisions for employees, some crystal gazing into the effects of automation, an analysis of expansion potential and possible diversification moves, and you have the makings of a program.

During the programing phase, the architect-engineer (or architect-engineer-builder) and any associated consultants are, in the course of data review, conferences, and physical inspection, learning how the business operates and absorbing a thorough knowledge of plant

FLEXIBILITY FOR HEAVY AUTOMATION

Where the goal is complete automation, with materials handling a part of the manufacturing operation itself, there is need for special emphasis on building flexibility. Even in automated plants where storage is actually part of the conveying system, parts and materials must be on hand to take care of equipment breakdowns, transportation delays, delays on customers' orders, and so on. Cunningham-Limp, Detroit, designers, engineers, and builders, foresee a single-story, multi-level structure to fit around this type of operation. The production level will be on the floor. Materials handling and live-storage will be on a second level, and another live storage and warehousing area on a third, both of which will be suspended from the roof. In this way, parts can be received and stored in the air near where they will be used, aisles cut down, and rehandling eliminated. The saving in warehousing area will, of course, be offset by the cost of added handling equipment, but the big saving will come in reduced handling and in flexibility. The building will be skin over a machine.

functions. (Naturally, as professional men they will treat this inside information confidentially.) Also, the specific site is analyzed in relation to expansion and growth patterns.

Finally, this close "partnership thinking" results in effective fulfilment of production requirements and engineering economics, plus the esthetic intangibles.

About five years ago, the Pepsi-Cola Company's board of directors decided to embark on a coast-to-coast expansion involving not only their own facilities but those of their franchise bottlers. Emmett R. O'Connell, president of the Metropolitan Bottling Corp. (Pepsi's wholly owned subsidiary), immediately took his newly retained architect-engineers through several of the Pepsi bottling plants to acquaint them at first hand with the process of bottling Pepsi-Cola. His only request was for the architect-engineers, working with members of his own staff, to produce a building prototype suitable for any part of the country.

The entire process of producing and distributing Pepsi-Cola was studied. Space requirements for sirup-mixing and bottling equipment were analyzed. Storage standards were related to ceiling and roof heights. Column spacing was coordinated with all major functions. Finishing materials were selected with an eye to both sanitary and economic requirements. Truck loading and circulation and servicing were related to both site and structure. Future requirements were anticipated and provided for. In addition, architectural treatment was standardized in the structural module, so that anyone could recognize a Pepsi-Cola plant by its material and color.

The factory will eventually be reflected in the balance sheet under "indirect factory costs." The prudence of the investment is bound to have an effect on production statistics, labor relations, and general morale.

Strong, reinforced, and *mobile* flooring is made possible by these prefabricated "rafts." Each unit can be readily lifted out for replacement, maintenance costs are greatly reduced.

The initial budget for a plant facility is commonly based on what management hopes is an adequate estimate of dollars per square foot. The fallacies in this kind of budgeting are numerous. All too often the figures are pulled out of thin air by relying on some current index estimate for average plant construction, which takes into account neither the specific requirements of a particular plant nor the pro-rata conversion to regional or local conditions. A wrong guess can be misleading and harmful.

Actually, there are no dependable "curbstone estimates." The best protective measure is to authorize the architect-engineer, upon completion of the facilities program, to produce preliminary plans and specifications sufficient in scope for a qualified costing agency to provide reasonably accurate estimates. A budget may then be safely established.

Form Follows Function

The early American factory was a purely functional building, doing little more than protect the workers from the extremes of the elements. Central heating, controlled lighting, and employee comforts were unheard of. But the construction techniques of our first factories, although limited to wood, stone, and brick, were nonetheless consistent with the limitations imposed on manufacturing itself. The simple industrial processes did not impose extreme floor loads or complex mechanical requisites.

As industry became more mechanized and accomplished, its contributions to the science of building could be measured in terms of construction progress. The production and adaptation to building requirements of cast iron, steel, brass, copper, aluminum, plastics, and so on matched the technological advances within the factories.

Regard for the human element, that is for better working, safety, and comfort conditions, demands a combination of mechanization and cheerful, efficient work areas. Among the improvements now provided by architecture and engineering are: comfortable atmospheric conditions; controlled lighting (far more efficient and pleasant even than that provided by the not-so-long-ago and popular monitor-type, or skylight-type, roof construction); vinyl materials to walk on; acoustic materials to reduce noise; long spans to facilitate circulation of personnel as well as materials; synthetic materials like asbestos board, color-impregnated glass, and porcelainized metal to

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Functionalism in Factory Buildings

The early attitude that industrial building was merely an enclosure to house machines and men has not yet softened sufficiently to permit luxury in plant facilities. However, recognition of the human problems in industry has noticeably tempered some of the austerity associated with plant design.

As early as 1909, the distinguished German architect Peter Behrens designed the *Turbinenfabrik*, a factory often cited as the "first modern building." Today, factory buildings are still trend-setters in contemporary architecture. But there is no need for management to expend funds on meaningless window dressing. Proper organization of the basic elements of design—appropriate use of materials, a tasteful regard for mass, proportion, texture, and color, and an honest expression of the building's function—results in the best architecture. The architect-engineer has learned to produce good-looking buildings that are functional in almost the purest sense.

The average person probably associates "prefabrication" with the idea of prebuilding a complete structure in a factory and assembling whole sections in the field. This is done, of course, in some instances, particularly in small-house building. But in industrial construction, prefabrication, which is one of the most significant modern developments, has made its greatest contribution in terms of labor-saving individual parts, each a mass-produced precision product integrated with other precision products.

The laborious assembly of minute elements like bricks is fast disappearing. Now factory-built outside wall panels and inside partitions, roof decks, prefabricated floor slabs, and large roof trusses of laminated wood or steel are being used. Ductwork for electrical conduits or, more recently, for air-conditioning is made part of flooring that comes in sections.

In mid-Summer 1957, a top executive of a leading Midwestern food-manufacturing company walked into the New York offices of an architect-engineer organization and inquired whether the concern had the know-how and imagination to develop for him, on a master-plan basis, facilities to be built up to and including at least 1976. Some new buildings were required almost immediately, but they would be only a small part of the integration of various units planned for the next twenty years. Because his industry is growing at such a rate, the executive admitted that even the facilities built today might be outmoded by the time the master-planned constructions are completed. As in tooling and automated equipment, newer concepts would then be required.

Not all new plants will be outmoded in twenty years. Still, management will be wise to encourage staff engineers and retained architect-engineers to continue "imagineering" with new, and even untried, materials and methods.

What are the trends in new methods and materials? It will help to clarify the picture if we discuss them in terms of four major management interests: (1) flexibility and maneuverability; (2) electrical and mechanical features that help transform the building itself into a "machine"; (3) the human factor; and (4) cost.

Built-in Flexibility

Flexibility in plant design has become a vital requirement. Easy expansion, ready rearrangement of existing equipment, substitution of more efficient equipment, and adaptation to unforeseen deviations from existing patterns of operation, all demand it. It is fortunate that the exodus of plants from congested urban areas has occurred at a time when the need for flexibility has taken on urgency, for flexible design is ideally suited to single-story operation. This is not so readily obtainable in the multi-story labyrinths of the cities, which hinder lateral expansion.

Built-in flexibility bids fair to relieve management of one of its biggest headaches, for it can turn a fixed liability into a more fluid asset. Here are some of the more important ways in which architect-engineers achieve built-in flexibility:

● **The module.** This is a basic grid pattern that coordinates the location of fixed items such as window mullions, lighting fixtures, air-conditioning diffusers, stairways, exterior doors, service equipment rooms, and the like. Determining the proper module is complicated, because plant layout, which may include complex assembly and conveyer lines, must be considered. But once established, rearrangement of equipment and conveyers can be effected without elaborate power changes, and partitioning can be

moved without complicated mechanical and electrical alterations. Orderly lateral expansion in any pre-planned direction is also made easier.

● **Exterior curtain walls.** This wall, or "skin," is usually an assembly ("sandwich panel") of an exterior and interior skin with a filler between. The skins are usually a thin, lightweight, durable metal or concrete that is resistant to weathering, handling, and normal impact. The filler is a lightweight material that provides high thermal insulation and often a high sound-transmission barrier. These factory-made units are easily removed and re-erected.

● **Structure.** For lateral expansion, column footings and columns at the point of expansion are stressed for future additional loads. Riveted connections are played down in favor of bolting. Floor capacities are often "beefed up" to permit unrestricted moving of equipment. For upward expansion, column "stubs" are allowed to run past roof lines to secure future columns. "Knock-out" floor slab panels facilitate future construction of pits. Additional piles near the perimeter of the building may be recommended so that future contiguous construction will not disturb the existing building.

A plan with few columns, providing long spans for floors and roofs, is most advantageous for maneuverability. The additional expense for long roof spans is relatively small, and today spans of 60, 80, or 100 feet are not uncommon. For floors, however, long spans are much more expensive, because loads are often large. So, for example, in buildings where the roof is the only structural framing supported, large bays up to 80 or 100 feet are practical economically, but the additional expense of long spans on several floors mounts very rapidly in multistory buildings.

Wood, reinforced concrete, and structural steel are available for structural systems. Wood is the cheapest way to span great distances, where loads and codes permit. Its availability as against higher-cost steel has dictated its application in many West Coast buildings, where transportation of steel is a factor.

A modern development is pre-stressed reinforced concrete, cast in the form of beams and using alloy steel cold-drawn wires. After the concrete is set, the wires are tensioned and permanently clamped. These beams can be used on longer spans, but unit cost is high.

Reinforced concrete can be used in shell construction, where a very thin slab relies for its strength on its curved

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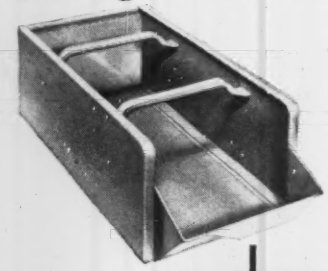

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shape. This permits spectacular domed effects, for instance, but is generally much too expensive for industrial use.

Obviously, every building presents its own problems of function, size, and shape. Usually it is worthwhile to prepare several brief preliminary outline designs and specifications, using different types of construction. These must be studied for initial cost and maintenance as well as for maneuverability. Often the same end results can be achieved with either steel or concrete, the choice depending on the ratio of cost at the time of building.

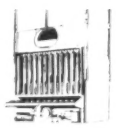
- **Light and power.** Especially in factories where many small machines are used, flexibility is achieved by underfloor electric power ducts with outlets at regular intervals. But the electrical engineer's main contribution to flexibility is circuitry that permits reasonable rearrangement without major electrical changes.
- **Heating, ventilating, and air-conditioning.** Developments in these areas are discussed on later pages. But plans for flexibility must, of course, begin with the selection of such basic equipment as boilers, fans, compressors, cooling towers, pumps, and so on. In making decisions, engineers must weigh the possibility of change. The capacity of boilers, for instance, may be designed for heating a moderate addition to the facility.
- **Plumbing.** In addition to distribution for future requirements, flexibility requires attention to strategic location of valves and plugged tees and Y's, the use of "wet" columns, the layout of floor drain systems, and so on.
- **Partitioning.** In the plant, partitions should be easily demountable and movable, particularly in the plant's office areas. Here management has turned to the manufacturers of metal and glass office partitions for layout flexibility.

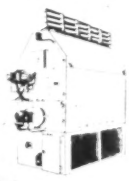
The Building as a "Machine"

Any planning for tomorrow's factory must follow the concept of the factory as a machine—quite aside from working conditions. Architecture - engineering must now embrace almost every engineering specialty to provide "machines" that are, for all practical purposes, independent of environmental conditions and increasingly an integral part of the production processes.

Intercommunication systems have become comprehensive. Interoffice telephone facilities are modulized to fit effectively into all master-planned positions. "Squawk-box" hookups now connect key personnel and department

modern heating for business and industry





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Audio-communication networks broadcast announcements, inquiries for personnel, important news bulletins, fire or disaster warnings, and general instructions and announcements. These public address systems can also be used for reproducing music, popular radio programs, and other features calculated to improve morale.

Electrical engineering has responded to special demands: electronically sensi-

THE AUTHOR • As a "member of the team" at Skidmore, Owings & Merrill, Albert Kennerly has been associated with commercial and industrial construction in many parts of the country. During World War II, Mr. Kennerly set a production-efficiency record when he directed the conversion of a 30,000-ton floating drydock into a "submersible" assembly plant for the construction of Navy landing craft. A native of New York, he was graduated from Columbia University School of Architecture. He is an ardent yachtsman.

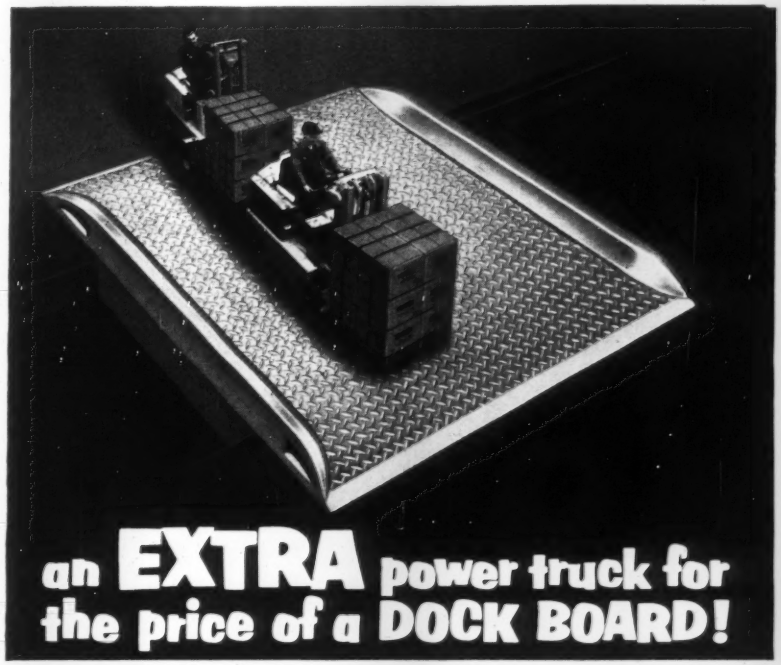
tized burglar alarm systems, gas and vapor detectors, atmospheric and humidity control, electronic master panels with blinker lights to spot trouble areas, and automatic door-opening and door-closing devices. Light-sensitive devices control and maintain lighting intensities and qualities, particularly in chemical and synthetic manufacturing. They even permit control of the sunlight admitted.

The Human Factor

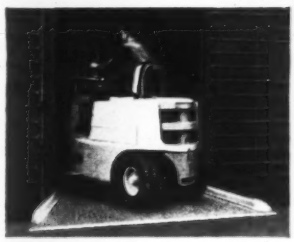
Enlightened management recognizes the wisdom of investing in nonessentials, such as cafeterias that are subsidized to keep food prices low, lounge and game rooms (even labor-committee meeting rooms), and athletic facilities, all of which can contribute to morale and production. Well-lighted parking facilities for employees are usually added in the programing stage. Free clinic and medical services are now the norm, and facilities must be provided.

Lighting intensities are continually increasing, with modern fluorescent and luminescent sources free of glare. General illumination is up to 100 foot-candles, a far cry from the dimly lighted interiors of a few years ago (see page 113).

Noise reduction and clean, controlled-

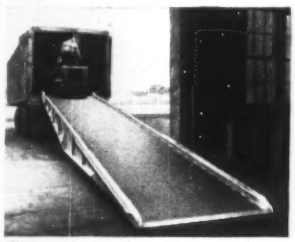


an EXTRA power truck for the price of a DOCK BOARD!



NARROW CONGESTED DOCK? This narrow railroad dock required a flared Magliner dock board, allowing power trucks to make sharp, right angle turns.

OUTLYING YARD CARS? No problem to load or unload directly from dock with Magliner car-to-car dock boards. Eliminates car-spotting and demurrage costs.



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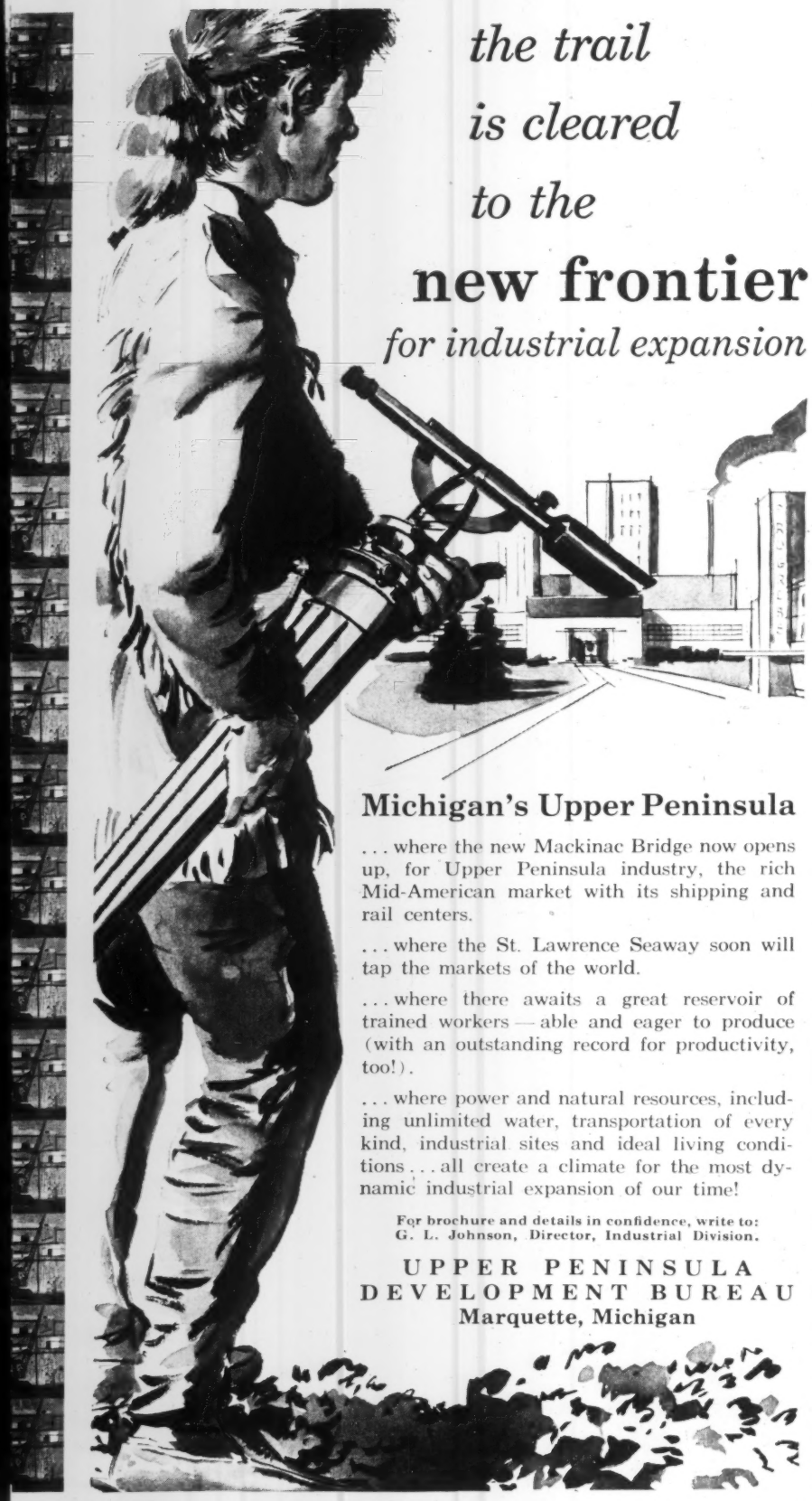

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temperature air are expected by today's skilled workers. Safety features far beyond those imposed by local ordinance, and in addition to a safety engineering staff and the dispensing of personal safety equipment, are generally adopted. For instance, building provisions against surface and mechanical hazards include: nonslip floor finishes, safety treads on stairs, handrails, rubber matting around electrical switch gear, safety guards and devices at mechanical equipment, sprinkler systems, fire doors and partitions, and light and audio warning signals at materials-handling or personnel crossings.

A half-century ago, central heating for comfort was in the embryonic stage. Today it is generally required by law. A generation ago, air-conditioning for comfort for office workers was a luxury. Today it is a necessity (see page 117). A few short years ago, air-conditioning in factories was generally limited to applications where humidity control and or cooling was required for the manufacturing process. Today interest is growing in conditioning for comfort, although no break-through like that in offices has yet occurred. Experience in many industrial installations of comfort conditioning has shown that it is paid for over a short period by reduced absenteeism and increased efficiency. Air-conditioning also permits the design of buildings that twenty or thirty years ago would not have been habitable during periods of high sun load—another instance of easing the site problem by technology.

Stainless steel curtain wall panels, 28 feet high, are easily put into place at the new Yoder Company plant in Cleveland. A masonry wall would take nine months longer.

Generalizing about construction costs is a risky business. It will be more useful to outline price trends since just before the last war and give some specific recent examples.

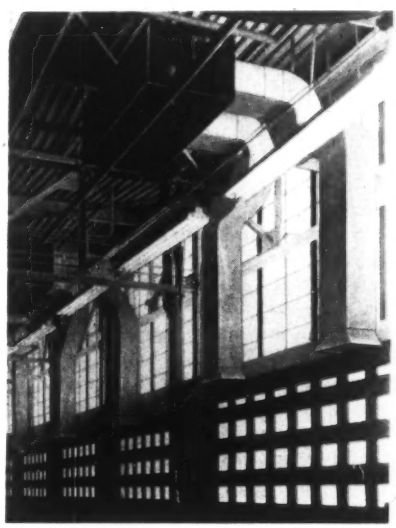
One of the largest general contracting firms reports that, since 1938, industrial construction prices have increased 170 per cent. In other words, construction, like other aspects of the national economy, has felt the effects of the inflation of the past twenty years. Designers have done their best to offset the increase by using the prefabricated elements and new materials and methods already cited.

It is interesting to note that two phases of construction, mechanical and electrical, represent a higher proportion of total average construction cost today. These have gone from 25 per cent of all costs to 35 per cent. Structural work has also increased to some degree.

To suggest how far the construction dollar actually goes today, here are data on a few recently completed projects which illustrate types and costs of facilities:

NORTHERN MIDWEST: A manufacturing plant for cosmetics, with warehouse and office facilities, one story high. Nicely finished exteriors, air-conditioned offices, comfort ventilation in other areas. Approximately 400,000 square feet. Cost $10 per square foot, exclusive of landscaping, roads, well drilling, and railroad siding.

NEW YORK AREA: A processing, bottling, and distribution plant for soft drink manufacturing, one story with mezzanine, containing 134,000 square feet. Quality exterior, fully tiled bottling and processing rooms. Large trucking and warehousing



When doors are raised, blasts of warm air "seal" space at Chrysler Corp.'s Kokomo (Ind.) plant. In the offing: walls of re-circulated air holding 80° inside at –20° outside.

Champion Paper gets weathertight, fire-safe product protection in this new Armco Building

The Champion Paper warehouse pictured above is composed of three 40-foot-wide bays, 100, 140 and 180 feet long. They provide the required warehouse space in a triangular-shaped plot while still taking advantage of low-cost, standardized construction.

Paper is a tough product to warehouse: it requires a lot of space, and it must be kept dry.

The Champion Paper and Fibre Company helps solve these problems with their new Armco Building. The interlocking wall and roof panels of this all-steel structure make it exceptionally weathertight, prevent moisture penetration.

And, since an Armco Building is noncombustible, it's ideal for warehousing materials such as paper. If fire breaks out, the all-steel construction helps contain it. Losses are minimized.

Wide, clear interiors give wall-to-wall, floor-to-ceiling use of space with plenty of maneuvering room for lift trucks. Large plastic roof panels are often used to cut down artificial lighting.

Each Armco Building is *built around a business*. Precision-made parts can be combined in an almost unlimited range of building sizes, shapes and arrangements from 28 to more than 100,000 sq. ft.

Special Armco designs and production methods, rapid erection, early move-in dates—all reduce initial cost. And, these steel structures practically eliminate maintenance costs.

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WARREN BELTING CO., Worcester, Mass.
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EISENDRATH GLOVE CO., Marinette, Wisc.
Established 1892—Manufacturers of men's and women's gloves.

Plans for each of these 3 companies embraced research, improved inventory and production controls, modernization and expansion through new equipment additions and the addition of new lines. The acquisition of these companies by Aetna Industrial created new horizons of growth for each. . . . They are all now operating profitably.

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MIDDLE WEST: Biscuit manufacturing plant, one story. Glazed tile interiors, sanitary features throughout, fully air-conditioned offices, and employee facilities areas. Warehousing and trucking areas. Some site work and landscaping included. Area 650,000 square feet. Cost $13.50 per square foot.

NEW ENGLAND: Paper-converting mill. One story, limited office areas, moderate spans. Area 450,000 square feet. Site work, boiler house, and utilities included. Cost $15 per square foot.

NEW JERSEY: One-story manufacturing plant for heavy equipment. Built-in expansion features. Area 260,000 square feet. Landscaping included. Cost $14.48 per square foot.

FAR WEST: A food products manufacturing plant. Area 42,600 square feet. Cost $13.10 per square foot.

One research group has produced some rather interesting statistics on the monetary relationship between plant construction and industry's production operations. These indicate that only about 5 per cent of the total industrial operation is chargeable to the plant facilities.

There is little likelihood that the plants of tomorrow will suddenly take on a space-age appearance. But the trends now evident do permit some insight into future physical forms.

Automation has for many years been developing in refineries, pulp and paper mills, and in long-run manufacturing operations involving automatic transfer of materials and semi-manufactured items from one mechanized operation to the next. In general, automation of this type has not been merged into the architecture of the building. However, some companies today are aware of the interesting esthetic possibilities in some of their major equipment. For example, at New York's International Airport, the refrigeration and boiler plant facilities were deliberately "showcased" for the public by careful arrangement and color coding. Perhaps industry will increasingly realize that an interesting and complex operation like a power plant can be incorporated into the esthetics of site development.

Similarly, the plant of the future will take advantage of conveyer elements to create additional interest in exterior design. Perhaps many conveyer systems will be moved from within the building to the perimeter to free floor space.

In many types of manufacturing, the facility will increasingly become a machine—in itself a complex of automation. More parts of these "machines" will

be arrangements of equipment completely exposed to the elements. The "open-air factory" is already seen in refineries and other process industries (see page 111).

LET'S DREAM A LITTLE!

Radical changes in future factory design are foreseen by some men in the field. Manufacturing plants enclosed in giant plastic bubbles, or completely underground where weather never changes, are pictured by Alfred S. Alschuler, Jr., of Friedman, Alschuler & Sincere, Chicago architects and engineers.

Alschuler thinks that automatic plants may be enclosed in inexpensive air-pressurized plastic bubbles.

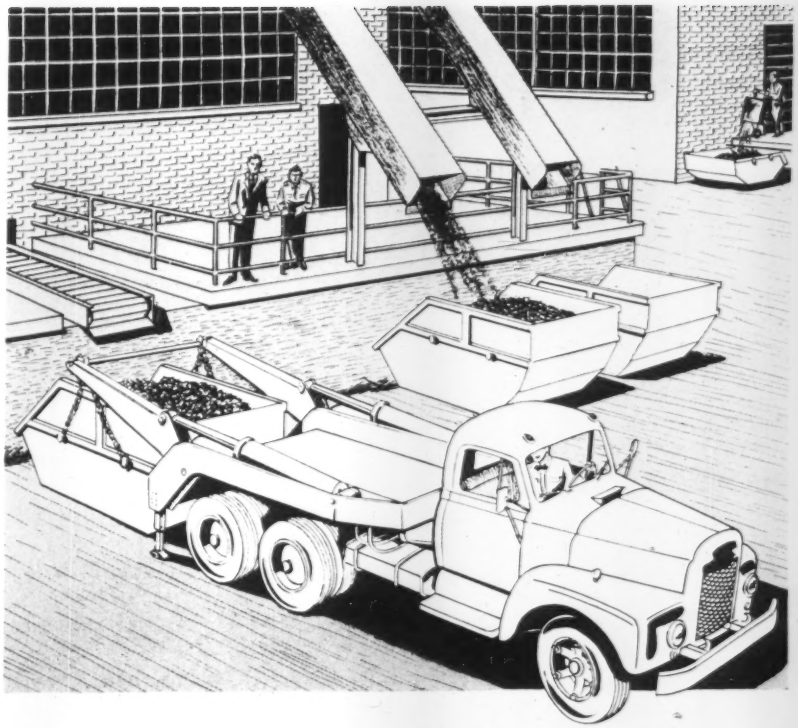
"Automatic plants may become much smaller when mechanical brains make a smooth flow of raw materials into a plant, and the finished goods go from the plant right to the distributor or to the customer," he says. "Parts can be delivered over air lanes at speeds up to 2,000 or 3,000 miles per hour. The sun's energy will be harnessed for heating, cooling, and power. Luminous-wall lighting may be provided by energizing plasticized wall coverings. New materials, inventions, methods, and uses may make present plants obsolete faster than we now believe possible."

What about materials? The sky is the limit. It is only a matter of time until the plastics industry develops structural elements for buildings that will be light, low-cost, and beautiful.

The aluminum industry has succeeded in pre-forming lightweight domes that span enormous areas. Ceramics has made huge strides in stainproof, acidproof, and long-wearing surfaces. The prefabrication interests are developing industrial floors that can be removed or renewed without disturbing the main structural elements of the building. Stainless steel manufacturers are developing lightweight, thin-gage, deformed sheets that will make it possible to span huge areas without the use of beams because of the stresses induced by deformation. In almost every type of material, research groups are active in seeking the answer to low maintenance and durability.

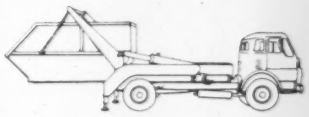
Judging from the exciting results of the last few years, enlightened managements will increasingly encourage more dynamic architectural-engineering solutions to their problems.

Pace-Setters for Tomorrow page 110



How big a bite does materials handling take from your profits?

Materials handling is a *cost*, reflected in your company's break-even point. The greater the variety of materials, the greater your need for various types of equipment, and attendant investment and operating costs.



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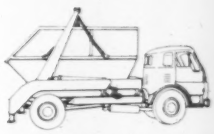
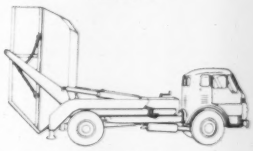
The Load Lugger System helps you increase plant productivity and reduce the cost of handling materials of all kinds — in-process, by-products, parts, bulk, rubbish, sludge — solids, liquids and gases. Because a single Load Lugger truck and its driver can handle dozens of patented steel Load Lugger containers designed for these materials, your equipment investment and labor needs are less.



HAULS IT



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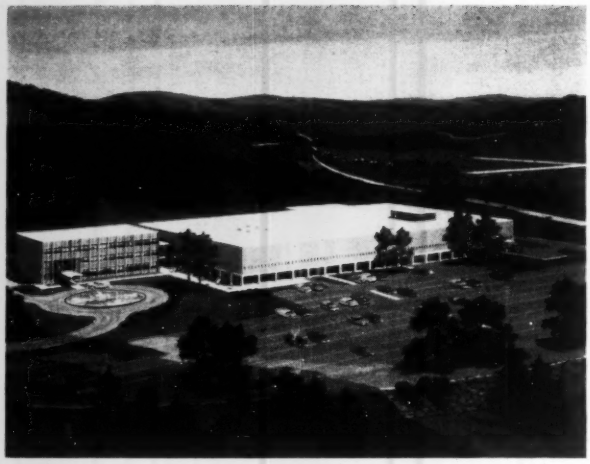
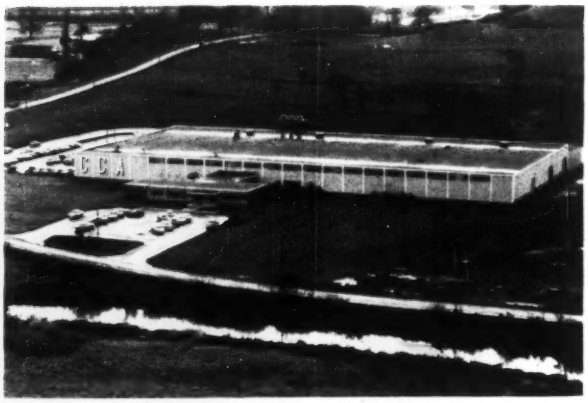
PACE-SETTERS FOR TOMORROW

An Album of Recent "Bests"

These plants illustrate how industrial architects, engineers, and constructors are effectively solving a variety of industrial facilities problems for large and small companies.

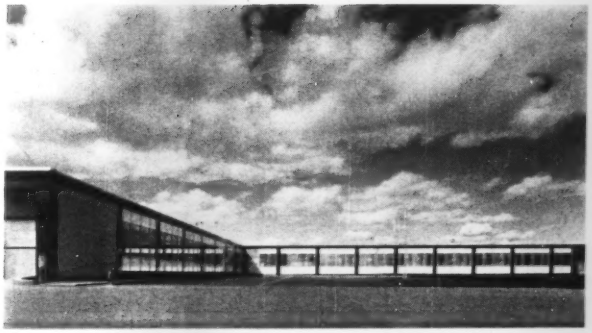


Designed for the production of precision ball bearings, Barden Corp.'s plant in Danbury, Conn., will feature a completely air-conditioned and controlled environment. Critical areas, which will deal in millionth-inch tolerances, will have filtered air, with temperature at 75° F and humidity at a maximum 40 per cent. *Sherwood, Mills & Smith, architects; Austin Company, builder.*



Taking advantage of the low cost of laminated wooden beams on the West Coast, Container Corporation of America used them throughout its Renton, Wash., plant. Tilt-up panels also add to the attractiveness of the building at no extra cost. The plant, which makes shipping containers and flexible packaging, occupies eight acres. *John Graham, architect, CCA design department.*

A "residential effect" was the stipulation for this employee cafeteria of the Kimberly-Clark plant in Fullerton, Calif. The exterior wall of 1-inch-thick porcelain enamel and plate glass provides beauty with low maintenance cost. Landscaping increases the desired effect. Integrated facilities include mill, machine room, and offices. *Skidmore, Owings & Merrill, architects and engineers.*

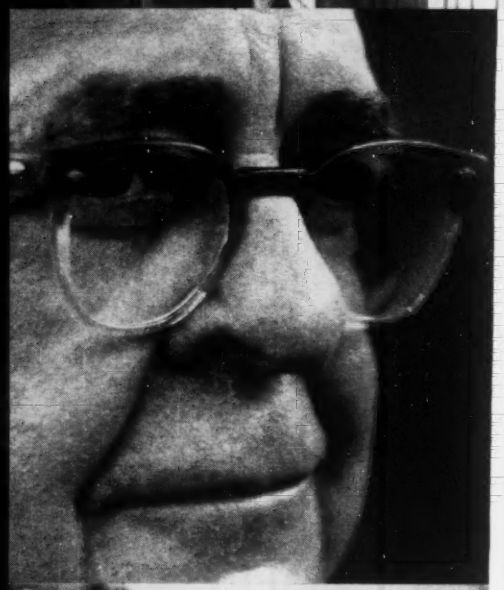


Simplicity was a basic requirement for Trane Company's engineering building. Exterior columns and floor slabs are faced with black granite in a pattern that follows the building skeleton. Exterior curtain walls, perimeter heating, interior movable partitions, and recessed lighting are all integrated on a five-foot module. In La Crosse, Wis. *Albert Kahn, Associated Architects and Engineers.*

This outdoor plant produces adipic acid for Monsanto Chemical Company. No building surrounds the actual processing mechanism. The only enclosed space is the small control center for operators. While open construction is ideal for process plants in the South (this one is in Luling, La.), its use is not necessarily confined to mild climates. *Designed and constructed by Monsanto.*

Part of a master plan expansion program, these units in Johnson & Johnson's Eastern Surgical Dressing plant are grouped diagonally to make additions easy. Design components include color panels of glazed brick and roof-to-floor windows. Blue glass is used on south, east, and west; clear on north. Plant is in North Brunswick, N.J. *Walter Kidde Constructors, designers, engineers.*

What's Ahead in Lighting?
page 113



"T-1" Steel gave us a 3-year jump on our competition

says Mr. Ben F. Lease, President, Athey Products Corporation

Athey Products Corporation makes off-highway earthmoving equipment. A couple of years ago, they began investigating U. S. Steel's revolutionary new "T-1" Constructional Alloy Steel, which is nearly three times as strong as structural carbon steel.

The first Athey rear dump trailer made from USS "T-1" Constructional Alloy Steel hit the market. It weighed *8,000 pounds* less than previous units, and carried a thumping 7½ cubic yards more payload. The unit was immediately accepted by the trade.

Then Athey really went into high gear. They built a revolutionary new bottom dump trailer that didn't even have a supporting frame! The USS "T-1" Steel body was so strong that it supported itself, and it achieved absolutely the highest capacity-to-weight ratio ever obtained in units of its kind. Buyers jumped for the new trailer, and they have bought over a million dollars worth since it was introduced. Competitors are already designing with the new steel, but Athey knows that the change can't be made overnight, so they enjoy a healthy lead.

If you'd like to clobber the competition with heavy-duty equipment made from this remarkable steel, write for our "T-1" book. Address United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

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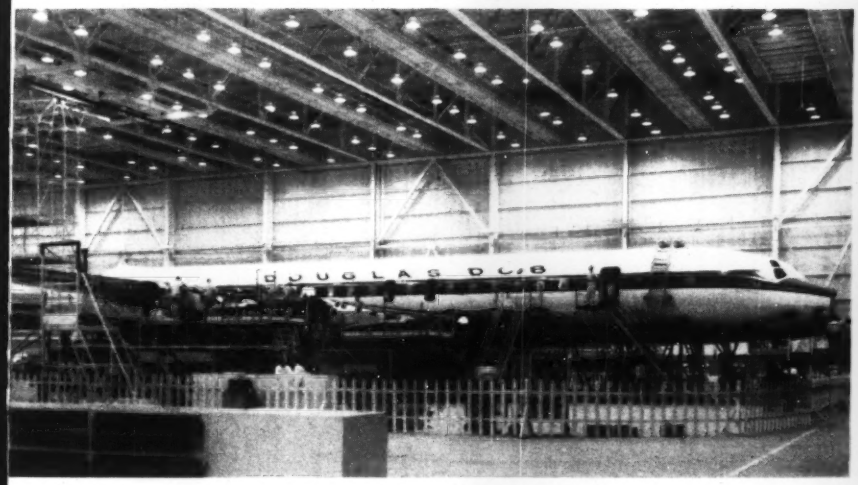
WHAT'S HAPPENING IN LIGHTING?



The greatest volume of man-made light in the world is at Douglas Aircraft Company's new DC-8 jetliner facility in Long Beach, Calif. In this Final Assembly Building, 400-watt Westinghouse mercury lamps are set inside the roof girders on a 53-foot mounting to permit clearance of planes. The high-intensity units in Holophane focusing-type reflectors direct light on working areas for even, high-level, nonglare visibility in all directions. To avoid a "tunnel" effect, the opaque fixtures pass some light upward.

"WHERE ARE WE GOING in industrial illumination?" DR&MI asked lighting experts.

"Brighter and brighter" seems to sum up the trend. To put an official stamp on the matter, the Illuminating Engineering Society is re-examining its recommended minimums. Many will be revised upward.

Higher working efficiencies dictate higher lighting levels. Today, 100 foot-candles from general overhead lighting is not unusual. A few years ago, 25 would have been high, 50 a curiosity.

Because lamp efficiency has improved, users are paying about the same for lighting energy as they did ten years ago, but they are getting about three times as much light per unit of input. Also, longer lamp life has lowered the cost of maintenance.

For Today . . .

"Fluorescent sources are increasing in life and brightness and in color choices available for critical color problems," points out Sam Hibben, long-time Westinghouse lighting expert, now adviser to industry on lighting problems. "A manufacturer of textiles or glass eyes or buttons can now make his selection from among a dozen fluorescent colors for best results. Fluorescents in such cases are better than mercuries or incandescents.

"Where color is not critical, the large plants have been installing mercury sources. They have a high concentration which can be focused and redirected, and wiring and maintenance costs are less. For lower heights—say 12 feet or under—fluorescents are usually called for. For higher ceilings, 400- and 1,000-watt mercuries are specified."

Low-efficiency sources and increased maintenance costs can easily double the lighting bill over that of a well-designed installation. For example, the longer life of mercuries can save replacement labor. Incandescents have about a 1,000-hour life, as compared with mercuries' usual rating of 8,000 hours. Actual performance for mercuries is almost double that figure.

. . . and Tomorrow

For tomorrow's factory, Sylvania Lighting Products' Research Vice President O. H. Biggs stressed the trend to very-high-output fluorescent sources, which are just now coming on the market. They give fluorescent some added advantages in many installations where mercuries are now specified.

Biggs also foresees more and more fluorescent luminous ceilings for extremely high general foot-candle levels without glare. "This spreading of the light is the answer for drafting rooms, toolmakers' shops, and the like, where we're giving as much as 1,000 foot-candles.

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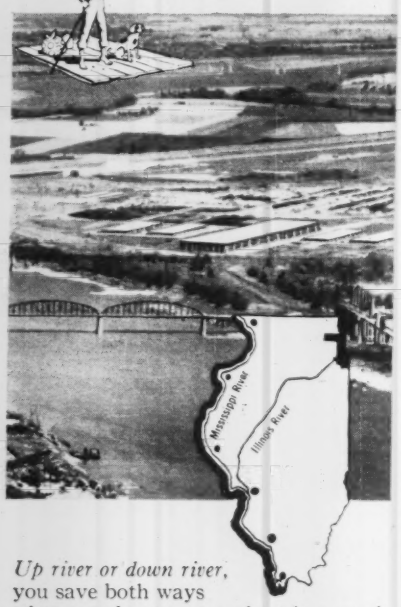

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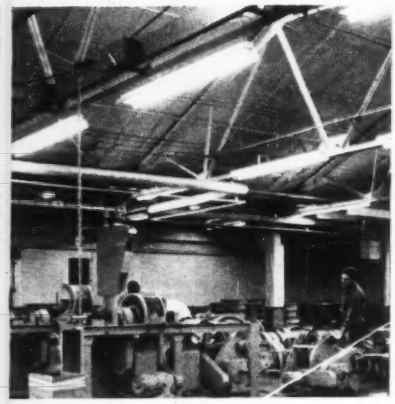

One of the first very-high-output fluorescent installations was made at Pennsylvania Transformer's Canonsburg (Pa.) plant. Fixtures provide a uniform 60 foot-candles.

"And just around the corner for fluorescent lamps are high-frequency supply circuits, which should give improved use-economy. These higher frequencies may speed the adoption of high-frequency portable power tools," says Biggs. "Also, we're exploring the use of high-output lamps for parking lots."

Douglas Aircraft's new DC-8 jetliner facility in Long Beach, Calif., illustrates the trend toward higher foot-candle levels for industrial illumination and the increasing attention being given to even light, avoidance of glare, and visibility in all directions (photo, page 113).

After 1,500 hours of burning, more than 75 foot-candles are provided horizontally, 40 vertically, and 60 at 45 degrees.

Operators have to do much of the work on the planes while they look "upside-down"—hence the need for even light distribution at odd angles.

Maintenance was important because the burning schedule is nineteen hours a day, six days a week. The much longer life and lower wattage per unit of light output of the mercury units made them preferable to incandescents. While standard fluorescents are comparable in wattage requirements, six to ten times the number of units would have been needed to provide the required illumination, which would have meant just that much more maintenance.

Pennsylvania Transformer Company's new Canonsburg, Pa., plant is equipped with the new Sylvania VHO fluorescent units (photo above). Use of conventional units would have meant two and one-half times as many fixtures to achieve the same foot-candle level.

A Break-through in Air-Conditioning page 117

NEW . . . for Floor-to-Floor Production Flow . . .

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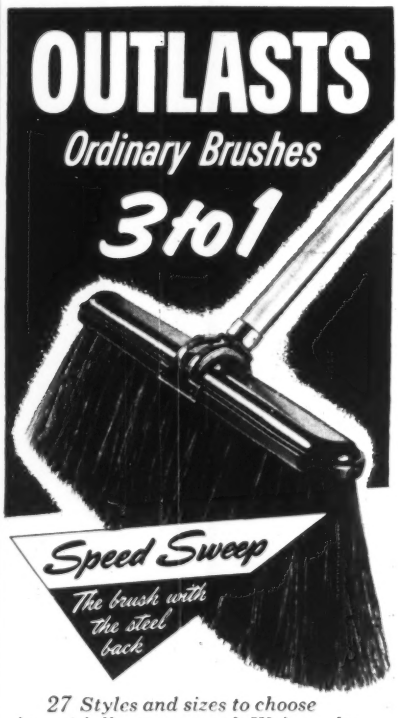

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Beauty moves out to the plant . . . to stay

No longer do industrial buildings stand in the shadows of their glamorous sisters downtown. For many reasons—working climate, community relations and pure efficiency—plants such as this Midwestern guided missile facility make beautiful sense.

In this case, special blue porcelainized panels of Alcoa® Aluminum help provide the answer. Known as Walcon "S" Panel, here is a sandwich-type wall in leather-grain texture that requires no maintenance, insulates and stays beautifully bright and clean the year around. And it's permanent because porcelain bonds better to aluminum than any other metal.

Similar developments in color, texture and new flexibility of design are part of Alcoa's *new look* for industrial architecture. What we have learned in this field through years of research and experience on hundreds of buildings is yours for the asking. Write: Aluminum Company of America, 859-D Alcoa Building, Pittsburgh 19, Pa.

Panel Fabricator: Walker Supply & Manufacturing Company, Ecorse (Detroit), Michigan

Alcoa Approved Applicator: Wisconsin Bridge & Iron Company, Milwaukee, Wisconsin

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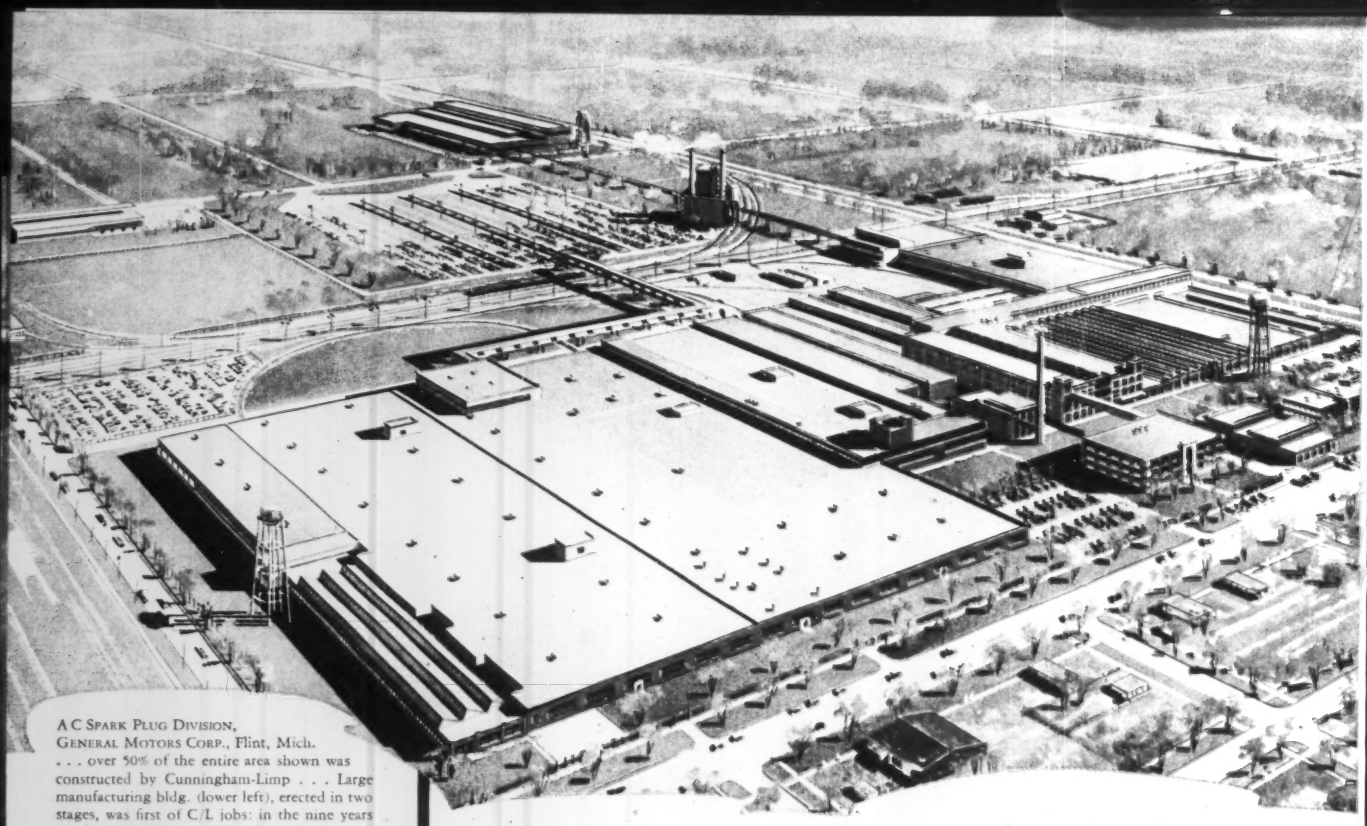

A C Spark Plug Division,
General Motors Corp., Flint, Mich.
. . . over 50% of the entire area shown was constructed by Cunningham-Limp . . . Large manufacturing bldg. (lower left), erected in two stages, was first of C/L jobs: in the nine years since, practically every type of project was done —for example—the power house (upper center), originally built by C/L, was doubled in capacity; a research building (left center) was erected; floors were renovated; much machinery installed; materials handling equipment was revamped, etc., etc. Work was also done in the Industrial Ave. plant, not shown. Some of these projects were designed and engineered as well as built by C/L.

Nine years and 528 building projects ago at A C Spark Plug Division

(how you can use all of the Cunningham-Limp services)

Nine years ago (Oct. '48), this Division of General Motors assigned the first C/L construction job. As of June '57, our 527th and 528th projects are nearing completion. As might be expected, the manufacturing facilities required by a large, aggressive company, which researches to improve present products and find new ones to market, are subject to frequent change. So, many of their projects are far removed from the "building" category and make use of the wide range of services rendered by C L (and available to you, also).

For example—the production line in one of the old buildings was torn out, the interior remodeled, and large presses, and other new production equipment was installed; the engineering, building and installation all done by C L. Another example —the waste treatment plant was built and all equipment, including the tanks, was installed by C L. Of course, there are many similar examples of C L's versatile experience in plant layout, materials handling, equipment purchase and installation.

One fact to keep in mind—most of these 528 projects were assigned to C/L under competitive conditions with price and completion dates the main considerations . . . And a second fact, which we hope is obvious . . . that you, too, can have full confidence in assigning Cunningham-Limp the complete responsibility for designing, engineering, building that project of yours—including the selection of the exact site, plant layout, materials handling, office layout, interior decorating and landscaping. In fact, you can call on us for analyses and reports on which to base your decision **whether to build** in the first place, and, if expansion is called for—**where to build** to balance the location of your markets in relation to labor and materials—**what to build** to secure greatest production efficiency and provide for the projected growth of your business—**how to build** to take best advantage of your resources and facilities . . . MANY OF OUR CUSTOMERS TELL US THEY LIKE THIS C/L METHOD. THEY PROVE IT TOO—OVER 90% OF OUR VOLUME STILL COMES FROM OLD CUSTOMERS.

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Send For The C/L Book—if you want 58 pages of help and information on building-engineering problems. It shows some of the cost-saving methods we use and lists many of the details that go into making wise building decisions. Request it on your business card or letterhead, please. It will be sent by mail.

90% of C/L's volume comes from repeat orders

In the building business, especially, repeat orders indicate customer satisfaction. Listed here are several of the well-known corporations which have found it profitable to use C L's design-engineer-build services at two or more "nationwide" locations. The complete list is available, of course.

Archer-Daniels-Midland Co.
Ashtabula, Ohio
Mankato, Minn.
Wyandotte, Mich.

Chrysler Corporation
Detroit, Mich.
Rye, N. Y.
Skokie, Ill.

Ex-Cell-O Corporation
Detroit, Mich.
Lima, Ohio

Ford Motor Company
*Birmingham, Mich.
*Indianapolis, Ind.
Lima, Ohio
Livonia, Mich.
Monroe, Mich.
*St. Louis, Mo.
Wayne, Mich.

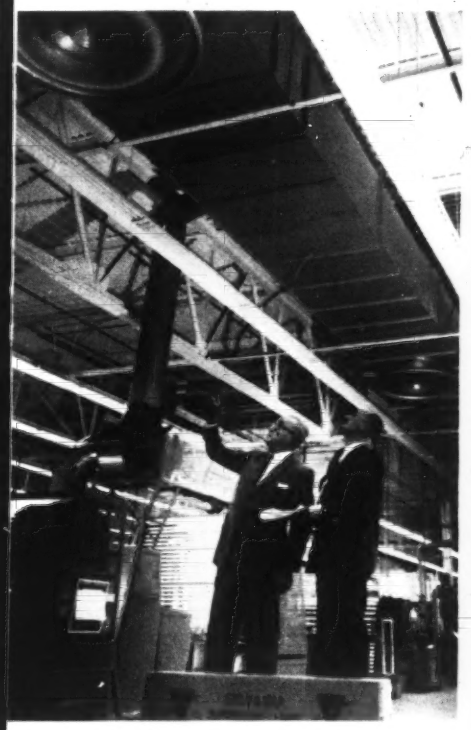
Latrobe Steel Co.
Buffalo, N. Y.
Detroit, Mich.
Independence, Ohio
Toledo, Ohio

Storer Broadcasting Co.
Atlanta, Ga.
Birmingham, Ala.
Detroit, Mich.
Miami, Fla.

Sunshine Biscuits, Inc.
Detroit, Mich.
Grafton, Ohio
Jeffersonville, Ind.
Omaha, Nebr.
Pittsburgh, Pa.

**designed by others*

A BREAKTHROUGH IN AIR-CONDITIONING



"We expect our $300,000 additional investment in air-conditioning for employee comfort to pay off," says President Frank J. Healy of Sylvania Lighting Products, here shown with Vice President H. F. Callahan.

"NOT HERE YET—but bound to come." That seems to be a fair summing up of the situation in comfort air-conditioning for America's factories, stimulated by growing concern for maximum labor efficiency and by increasing awareness of fringe benefits.

Full climate control—temperature, humidity, cleanliness—achieved widespread use years ago for high-precision operations and inspection and in textile, paper, tobacco, foodstuffs, and other plants where air-conditioning is important to the process. But DR&MI's spot check showed very few current installations for *comfort* conditioning. This finding was confirmed by engineers and industry leaders, although they are extremely bullish on the prospects for a breakthrough.

"Less than 1 per cent of U.S. factory space is air-conditioned," reports President D.C. Minard of the Trane Company, one of the largest industrial suppliers. "But we're convinced that as labor costs go up and cost of factory air-conditioning comes down, the increased working efficiency already demonstrated in offices will lead more managements to expand comfort conditioning to plants."

It will be natural for those industries requiring process conditioning to be the first to extend it for comfort. The Trane office at Greensboro, N.C., reports that by 1970 major manufacturers of textiles and tobacco will be almost completely air-conditioned. Smaller concerns will probably be air-conditioned by 1980. Very little new construction in either industry will go up by 1965 that is not fully air-conditioned.

An *Engineering News Record* report in 1956 found that "industry is installing air-conditioning in an estimated 15 per cent of new plant buildings." This was not limited to comfort air-conditioning, but the report quoted manufacturers as anticipating that "by 1960, 80 per cent of all new plants will be completely air-conditioned." Events have shown this to be optimistic, but some consultants estimate that as many as 75 per cent of new first-class factories and 50 per cent of Grade A factories will be air-conditioned for employee comfort within the next ten to fifteen years.

Anywhere at All

Interest is by no means confined to the South—as is strikingly illustrated by the new 118,000-square-foot addition to the Danvers, Mass., plant of Sylvania Lighting Products now being opened (photo above), the first completely air-conditioned fluorescent-lamp plant.

"We decided to go the whole way and air-condition for employee comfort," reports President F.J. Healy, "even though we knew that for our high heat-generating operations, considerable additional installation costs, to the tune of almost $300,000, or roughly 15 per cent of our new plant investment, would be involved above the cost of conditioning for certain processes alone—precision measurement, critical coating, and preparation of solutions.

"For example, our York equipment has 1,080 tons of refrigerating capacity, compared with process requirements of only 150 to 200 tons. As in our existing

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We will be happy to send you literature and answer any specific questions you may have. Your inquiry will be held in strict confidence.

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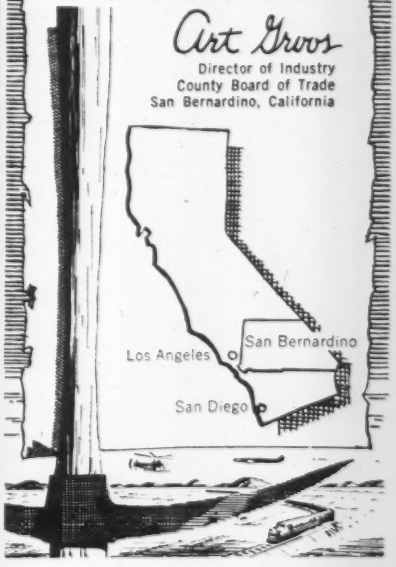

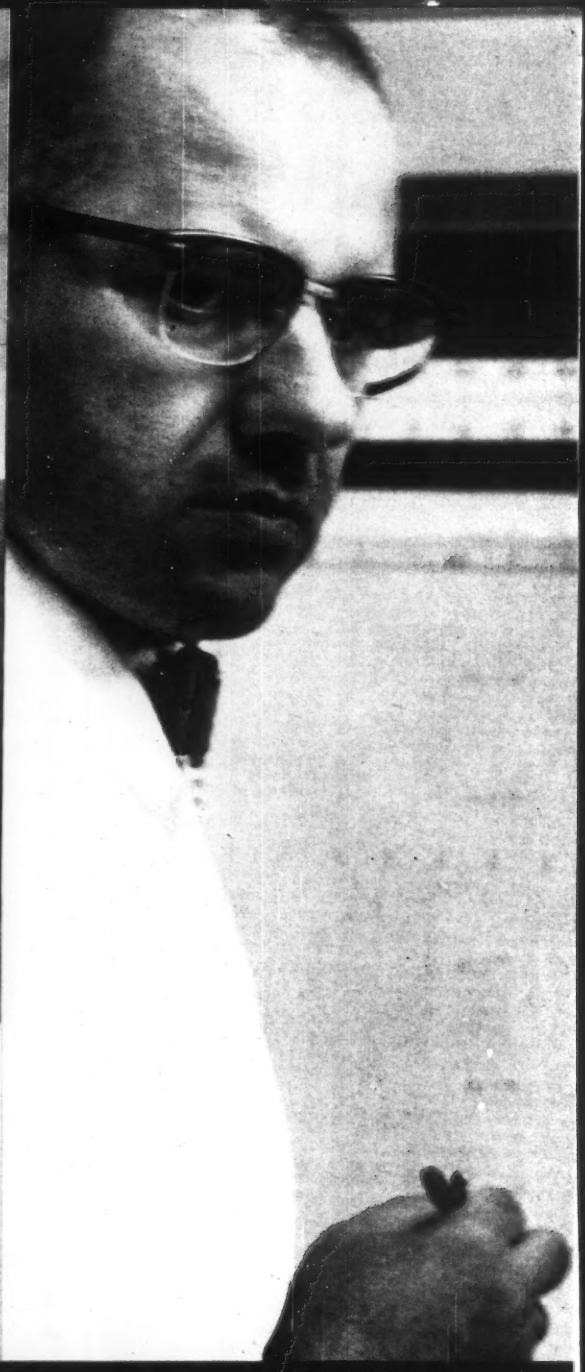

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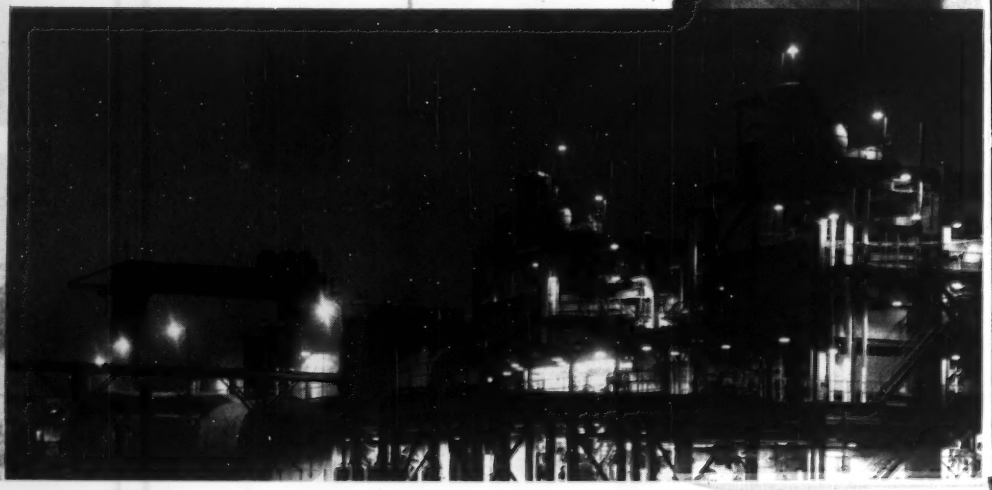

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building, we would, of course, have had to provide for air cleaning and circulation.

"We now have a plant that we know provides the best possible working conditions, and we expect to recover our investment by avoiding several days of summer shutdowns and costly early closings due to heat and humidity. But the morale factor alone, though not directly measurable, would in our eyes have made it worthwhile."

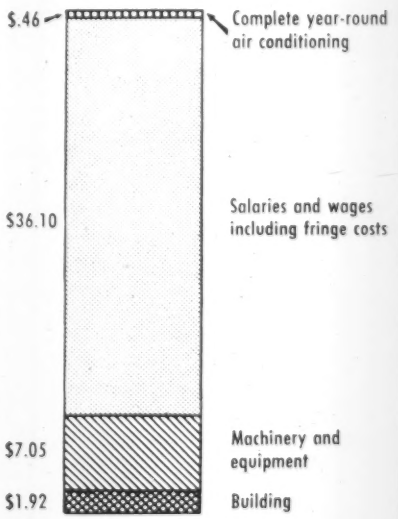
Comfort at Small Expense

Vice President John E. Haines of Minneapolis-Honeywell Regulator Company estimates, on the basis of studies made by Minneapolis (with an assist from Carrier Corp.), that in a new factory the cost of operating an air-conditioning system ten hours a day is 46 cents, including depreciation charges. This compares with $1.92 for operating the building, $7.05 for equipment and supplies, and $36.10 for payroll. These figures are admittedly based on average experiences, but they serve to show how small an increase in efficiency would be required to recover comfort-conditioning costs.

New, more compact, and efficient refrigeration compressors, fans, coils, and air-handling units, as well as improvement in installation practices, give today's air-conditioning investor more for his money.

Solving the Air-Change Problem page 121

NEW INDUSTRIAL BUILDINGS typical owning and operating costs per square foot per year



These figures indicate that only a 1.3 per cent increase in working efficiency would pay for complete year-round air-conditioning. Source: Minneapolis-Honeywell.

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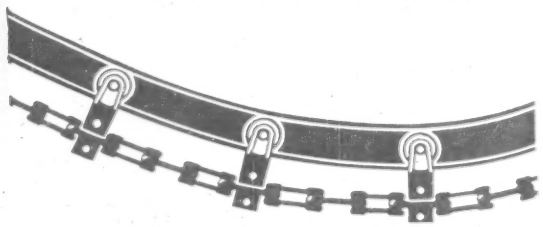

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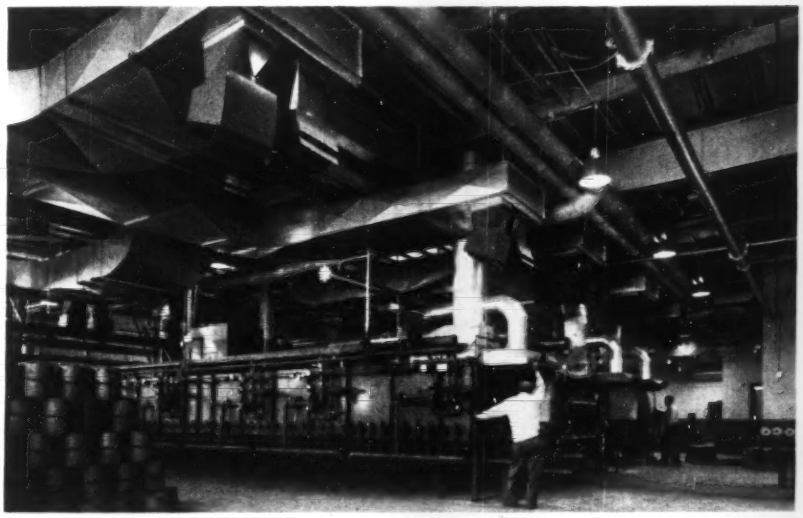
SOLVING THE AIR-CHANGE PROBLEM



Elaborate exhaust system provides rapid, draft-free air change for Austenal employees.

Beating the heat

Employees work close to a furnace that operates at 2,800° F in the Owens-Corning Fiberglas Corp. plant in Ashton, R.I. Opened in 1956, the plant produces glass marbles used in making Fiberglas textiles. Owens-Corning told the builders, Ebasco Services, Inc., that the plant must be "purely utilitarian, but combine maximum comfort with optimum operating efficiency."

In Winter, outside air enters the building at the lower level through adjustable aluminum louvers that pivot vertically. The cold air is tempered by circulating around the base of the furnace. Then it passes through the grating ceiling to the floor above. Surrounded by cool air, operators are protected from the terrific heat of the furnace walls. A large continuous roof ventilator can be adjusted to control the quantity of air.

In Summer, a second set of vertically pivoted louvers on the operating floor provides maximum ventilation.

100 per cent control

Facilities for wiring dial telephone banks occupy 15,000 square feet in the heart of Automatic Electric Company's new 1.5-million-square-foot plant opened in October 1957, in Northlake, Ill.

Banks of special-purpose benches are accommodated in the 40x60-foot bays. Each bay has its own system of ventilating ducts, which lead from the soldering pots to the roof.

The building, designed and erected by the Austin Company, provides for 100 per cent control of ventilation by means of standard units mounted up in the building trusses. An outstanding example of "convertible" design, the plant was constructed with enough space left between the trusses to take the equipment, such as extra cooling coils, that will be needed to add air-conditioning to the ventilating system. Also, the heating and ventilation ducts were sized for air-conditioning.

Quick-change system

"Eliminate furnace heat and the smoky, steamy conditions of the average foundry" was the specification for the new plant of Austenal, Inc., La Porte, Ind., opened in November 1957.

Flawless castings for precision work require alert operators and critical temperature controls for pouring. The ventilating system designed and installed by Wigton-Abbott Corp. produces a complete change of air near the furnaces *every 30 seconds*. Heavy-duty propeller-type exhausters at the roof pull out the heated air, and controlled make-up air (pre-heated in Winter) is distributed evenly through numerous outlets. The men working near the furnaces are often stripped to the waist and perspiring freely. Hence it is important that this ventilation system should accomplish an exceptionally high rate of air change without drafts.

Materials Handling in Your Plant
page 122

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Commissioner of Commerce

MATERIALS HANDLING IN YOUR PLANT

MATERIALS HANDLING is a major factor—it could be *the* major factor—in planning a new plant or for plant modernization. In wages alone, materials-handling activities took a neat $10 billion bite out of the 1957 wage bill for manufactured goods. Add to this the investment in all types of materials-handling equipment, and the effect of this factor is clear. In terms of percentages, materials handling represents 35 per cent to 40 per cent of *all* production costs—in some basic industries, as much as 75 per cent.

Considerable advance has been made over the past ten years in cutting the cost of materials handling, but it remains one of the few frontiers where costs can still be reduced. For example, handling costs vary widely among plants, even in the same industry. The plant hampered by the limitations of old buildings, the plant that "just grew," the plant where materials handling is regarded as not specially related to basic manufacturing, all these can often be helped to lower handling costs. However, lack of proper planning of buildings has in many cases made the task, if not impossible, at least impractical from an investment standpoint.

The importance of handling to overall layout and operations is exemplified by the recent experience of a company where a plant-wide pallet system was being installed. Aisle widths of ten feet were needed to handle the mobile equipment required. Among the buildings involved was one older three-story structure with 20,000 square feet of floor space and columns and supports on 14- by 18-foot centers. Floors were structurally inadequate to handle the loads. At best, either smaller or slower equipment would have to be substituted, or the aisles would have to be widened at a considerable sacrifice in usable floor area. Also, a major "beef-up" job was needed on two of the three floors.

A complete analysis of operating costs projected over a ten-year period indicated that the building should be razed and replaced by a more suitable structure. The move gave the company a definite competitive advantage. Only when management becomes sufficiently "suspicious" to pinpoint *actual* materials-handling costs and analyze their effect on other functions can their true significance in over-all control of operating costs be appreciated.

Where only warehousing operations are concerned, handling problems are usually more readily identifiable. It is in the complexity of manufacturing or processing areas that the handling factor often becomes obscured and must be isolated by careful operation analysis.

In the face of the increasing pressure on costs, the ultimate solution is the complete new facility—the plant of tomorrow. This calls for true *integrated handling*, based on the concept of a complete producing unit, planned with an eye on the full effect of each single function on all other functions. Production processes may even be modified to tie them in better with materials handling. Actually, this kind of thinking goes even beyond the bounds of a plant facility. The scien-

This article was prepared by a DR & MI panel under the direction of

H. B. MAYNARD
President
H. B. MAYNARD & COMPANY, PITTSBURGH
with

L. WEST SHEA
Managing Director
THE MATERIAL HANDLING INSTITUTE, INC., PITTSBURGH

WILLIAM E. KAPPLER
President
AMERICAN MATERIAL HANDLING SOCIETY, NEW YORK

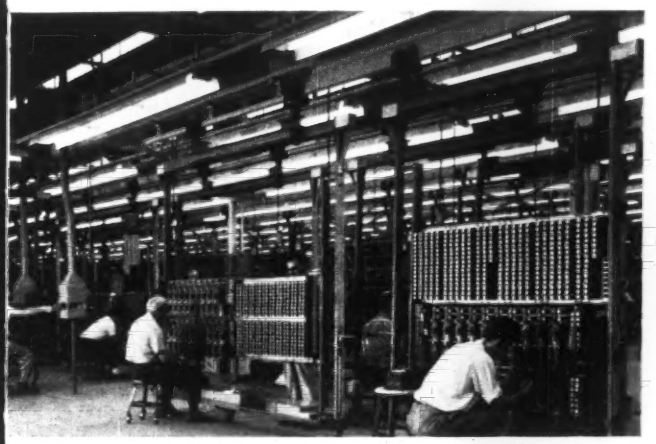
J. D. LOFTIS
Director of Product Projects
ACF INDUSTRIES, INC., NEW YORK

and the Staff of DR&MI

Vacuum disposal for delivery of scrap to baling machines at Container Corporation of America's Renton (Wash.) plant will be made standard throughout the company's plants. Push-button control now permits ready shifting to three different bins.

Absence of mast in the Automatic "Elbolift," with built-in retraction, helps in a tight squeeze like this at Continental Can Company's plant in Chicago. The load can be piled up and then, at any point, lifted off in separate units or simultaneously.

Lift-trucks with wheels that move in four directions handle long, bulky loads in narrow spaces at Canadair, Ltd., Montreal. Here, the Raymond truck came in sideways, wheels parallel to aisle. Then wheels were turned in position to move forward.



Processing on the move at Automatic Electric Company's Northlake (Ill.) plant: as automatic dial telephone switchboard panels move toward the shipping area on special conveyer frames, final assembly (soldering of the last connections) and testing are done. Carriers hang from monorails set at right angles to tracks.

The fork-lift truck offers materials-handling maneuverability out of doors. Here, the Baker Traveloader, a side-loader, is shown lifting a long, unwieldy length of pipe at the Western Steel Division plant of U. S. Steel Company in Salt Lake City, Utah. This truck can handle loads of 30,000 pounds, 20 feet or more long.

tific materials-handling system starts with the packaging of raw materials at the supplier's plant and ends only when the product reaches the customer's receiving dock.

Package design can have as much influence on handling methods as can more obvious factors, such as floor capacities and the like. For example, a significant increase in effective floor space can often be attained by slightly altering the dimensions or type of a shipping container. Such an approach requires an examination of raw material sources and the effect of their packaging and shipping methods on *your* costs. At the other end, the handling costs of market distribution facilities must be considered and the effect of these costs on sales volume and general acceptance must be assessed.

In fact, the integrated concept really seeks to eliminate materials handling as such. The key word is "flow"—that is, *processing on the move*, with coordinated flow lines extending from the raw material source, through receiving, processing, warehousing, and shipping, and ultimately to primary distribution centers.

Good for Large and Small

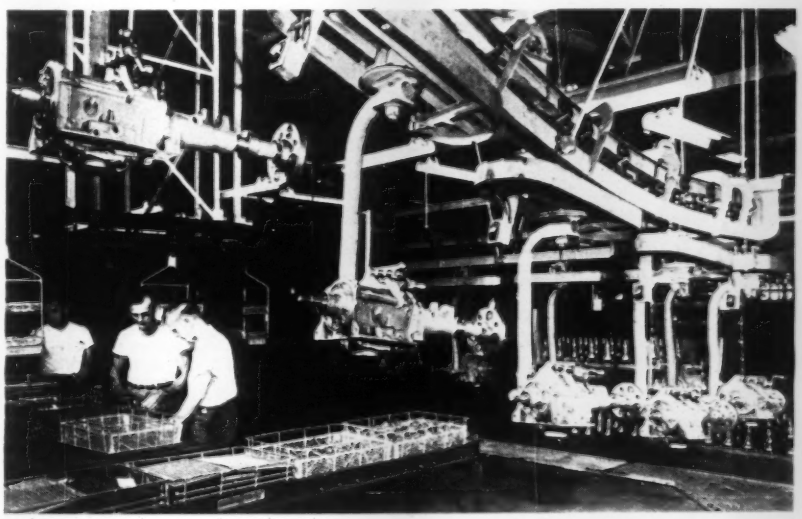
The past five years have produced a number of outstanding examples of this approach. Some, like the Ford Motor Company's new engine plant and foundry at Bedford, Ohio, and the Cleveland plant of Lincoln Electric Company, are large-scale operations.

Others are medium-size plants like Westinghouse's new small-motor plant at Upper Sandusky, Ohio. Here, the processing-on-the-move approach has been used with highly effective results. All material is work-in-process until it is a finished product ready for shipment.

But the trend toward integrated handling is by no means confined to completely new plants. The approach has been used to modernize existing plants, at least to the extent permitted by building limitations. The highly competitive brewing industry has taken some noteworthy steps in this direction. The can-delivery method used at the F. & M. Schaefer Brewing Company in Brooklyn is an example. Empty cans come from the supplier's plant in large, specially designed bulk bins from which they are fed by gravity directly to the filling lines. Intermediate handling has been eliminated, but this saving was made possible only by coordinating the shipping methods of the can supplier with the best system for the user.

Because integrated handling means lower costs, it has an important place in the planning of any new production facility. This calls for a free interchange of ideas. The architect, the industrial and process engineers, and the product designers, all must participate.

Terms like "integrated handling" and "systems concept" often conjure up a vision of highly specialized automatic equipment. This is a misconception. To be sure, great strides have been made in



"Surge"-line storage is used at Chrysler Corp.'s Powerflite transmission plant in Indianapolis. After assembly on the "power-and-free" line, transmissions rise to a higher elevation (above). When the rise is completed, they are disengaged on a free section for storage. About fifteen transmissions can be stored while they wait to be tested.

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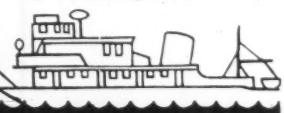

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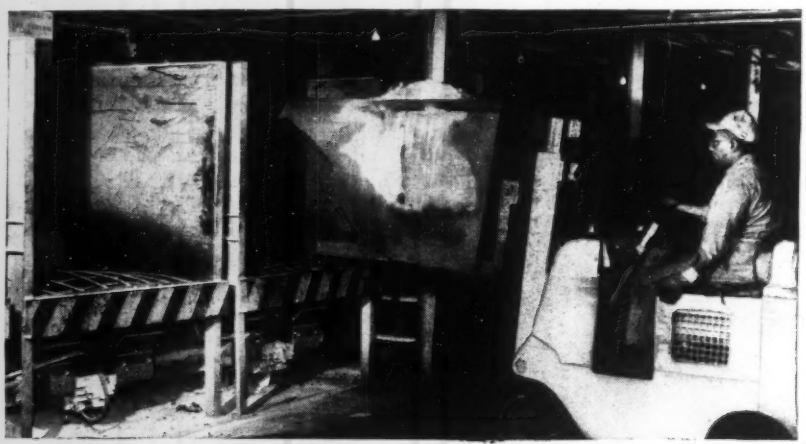

Ball Brothers cut handling costs with Self-Dumping Hoppers

Here's how Ball Brothers Company of Muncie, Indiana, manufacturers of glass containers, solved cullet handling problems, eliminating slow, costly manual labor. They formerly used wooden boxes, vats, steel barrels and man power. This method was slow, cost of handling high. Now, 80 Roura Self-Dumping Hoppers are stationed under the firm's container-forming machines. Molten scrap glass is shunted down chutes into waiting Hoppers. A standard lift truck picks up full Hoppers and transfers them quickly to a cullet crusher. With the flip of a latch, the Hopper automatically dumps its load, rights itself, locks itself, ready for another load. One man does the entire handling job.

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the design of highly specialized handling equipment. But a wide variety of near-standard equipment that can be fitted to a specific situation with the use of various accessories is also available.

• **Monorail systems** are a highly efficient means of handling loads on an intermittent basis. In this respect, they can be considered a competitor of the fork-lift truck. The advantages are no rigid floor requirements, better use of overhead space, and little or no need for aisle space. Against these attractive features, some possible disadvantages must be considered. For instance, routes and areas served must be more or less fixed and auxiliary mobile equipment may be needed to supplement the system. However, the latter is not necessarily an objection, for it is actually in line with the concept of making best use of any equipment or device that contributes to the function of the over-all system.

• **Conveyers** are one of the mainstays for handling materials in various forms, and some innovations in the conveyer field have still further increased their versatility. Witness the "power and free" overhead conveyer system pioneered by Jervis B. Webb Company. Within this system, loads are actually suspended from the "free" overhead conveyer line but are moved along by spring-loaded pusher bars connected to a parallel overhead power chain. Use of the spring-loaded pushers permits banking or backing up of loads when desired, thus providing storage for anticipated peak requirements at the production unit. The flexibility of such systems permits automatic dispatching, storing, and banking, controlled load spacings, and varying load speeds.

THE AUTHOR • Harold B. Maynard is an engineer and an authority on production and planning controls. As president of H. B. Maynard & Company, Pittsburgh, he has served as consultant on virtually every phase of business and industrial enterprise. Dr. Maynard is one of the originators of Methods Time Measurement, or MTM, a technique for setting work and production standards. Author of several books on technical subjects, he was most recently editor in chief of the *Industrial Engineering Handbook*, published by McGraw-Hill Book Company, Inc. Dr. Maynard has received many awards, including the Wallace Clark Medal for contributions to scientific management in the United States and abroad.

In the field of roller and belt conveyers, automatic control, combined with standard conveyer equipment, has produced mass-handling systems of high capacity. The 4,000-foot case conveyer system recently installed at the Pittsburgh plant of the Duquesne Brewing Company is handling 50,000 cases daily, with practically no attention other than routine maintenance. In addition to performing the basic function of transport, this system provides *en route* storage, stop-offs for processing, and automatic package sorting.

Whole sections of "live" roller conveyer in strategic areas permit backlogging of cases to allow for fluctuations in the bottling line. Conveyer lines are started and stopped automatically by a series of interlocked photo cells, limit switches, and accessory equipment. Lids of cases are opened and closed by guide rails, mounted parallel to the conveyer path.

Conveyer Versatility

This extensive use of automatic control, in conjunction with a well-planned conveyer system, which paces delivery to filling lines and reduces production downtime, has enabled the company to reduce costs drastically in a highly competitive industry.

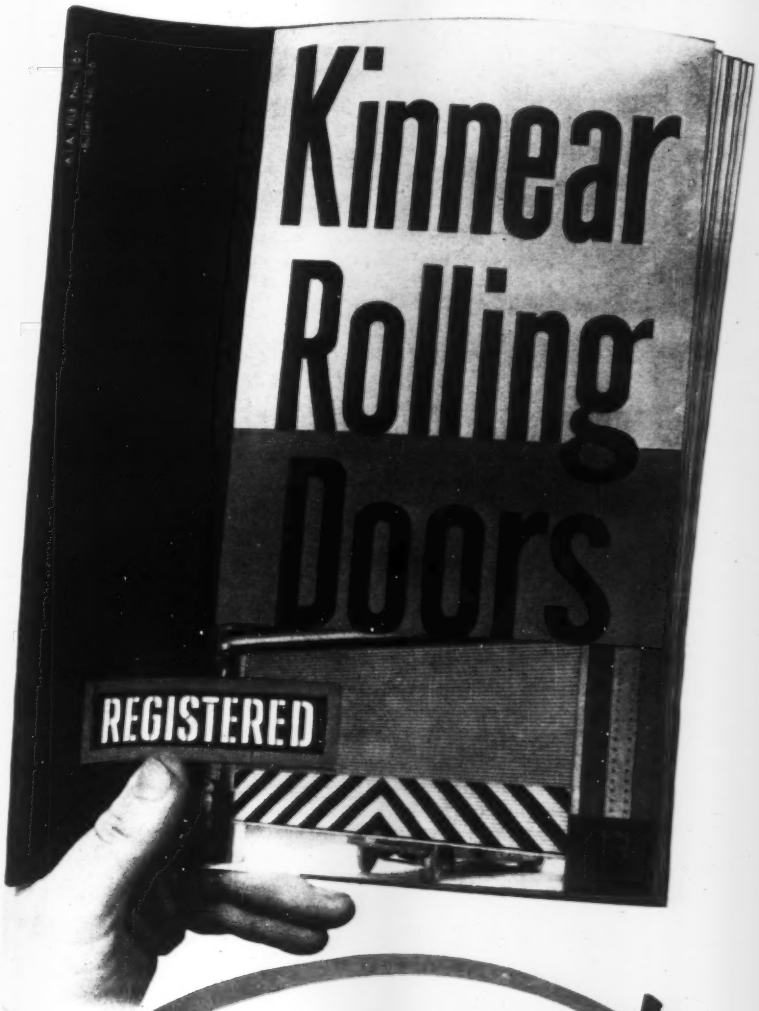
Other interesting types of conveyer equipment have recently been developed. For instance, a flexible steel belt conveyer can be made to go around turns in snakelike fashion, thus eliminating the roller curves required with a conventional belt conveyer; and the oscillating trough conveyer (developed by Link-Belt Company) carries bulk materials along in a uniform, continuous forward movement (even upgrade) by vibration.

Conveyers are also being used as moving assembly benches, which make for better control of workers' output and simplify inventory control because materials can move more directly.

These few examples are indicative of the many uses conveyers can be put to besides the basic one of transporting material.

- **Fork-lift trucks** and related mobile equipment also have come in for some significant developments in recent years. Time was when the rivalry between fork truck and conveyer people was fairly rough. Both have since come to realize that one complements the other. Materials-handling engineers fully recognize this and include both conveyers and fork trucks in their planning as needed.

The versatility and maneuverability of fork trucks have been greatly expanded,



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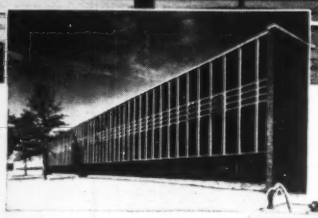
There are three major inter-connected buildings on a 300-acre tract, numerous trees having been retained to add to the beauty of the site. It goes without saying that the interior appointments are in keeping with the smart, modern exteriors, among them being thirty Halsey Taylor coolers of type shown.

The Halsey W. Taylor Co., Warren, Ohio



View of Maintenance Wing, finished with blue enamel steel cover plates and white trim, with red tile brick wall.

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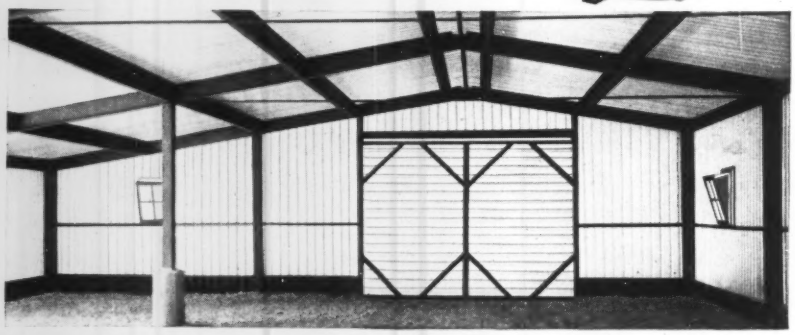

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with direct bearing on effective use of floor space. Not so long ago a ten-foot-wide aisle was the narrowest in which a conventional 4,000-pound fork-lift truck could turn 90 degrees, pick up a load, and return to its original position. The difficulty was that the extended forks could not be retracted and then extended under the load for picking up.

Several innovations have helped to solve this problem and reduce required aisle widths by as much as three feet. A pantograph mechanism for extending and retracting the forks is one attachment. Also available is a new fork-lift truck that eliminates the fixed mast of the conventional truck by an ingenious overhead lever-arm system. This results in better balance, lighter weight, and a much shorter turning radius for the truck, a product of Automatic Transportation Company.

Special-Use Accessories

A trend has developed toward the use of accessory attachments for special applications. With these, a standard fork truck becomes, to some degree, a special unit. The advantage of the "quick-change" feature is being recognized in the design of such attachments. The idea is to look upon the basic fork truck as a power source for various attachments or devices that can be changtd quickly to meet varying needs.

About 25 per cent of the fork trucks produced last year were "special" in this sense, and there is some feeling among fork-truck people that the idea may have been carried too far. For instance, clamping devices have been supplied at the user's request, only to result in excessive crushing of the package being handled.

As aisles become narrower, stacking heights become higher. Fork trucks are now lifting loads to heights of 16 feet and more, to attain 100 per cent utilization of overhead space. Stability of the load and resistance to crushing are usually the limiting factors here.

Floor capacities are a prime consideration in building design where fork trucks are used. Architects must be informed of the type and size of fork trucks to be used and the size of loads to be handled. For a typical 4,000-pound-capacity conventional fork truck carrying a capacity load, floors should have a minimum rating of 350 pounds per square foot. This again underlines the need for a team approach at the planning stage.

Out of doors, fork-lift trucks are becoming bigger and more stable. The trend is toward greater maneuverability and, at the same time, better balance.

For example, the Baker Traveloader side-loading fork truck was specifically designed for handling long, unwieldy loads and straight-line pick-up and delivery without backing or turning. Working indoors or out, and even over rough terrain, it can handle 30,000-pound loads in lengths of 20 feet or more.

When Space Is Scarce

Not to be outdone by their bigger brothers, lightweight powered trucks are also showing some new wrinkles. These are the "walkies" (operator doing the walking). On one such type, the use of "outrigger" legs extending from the front permits operation in extremely close quarters. Going a step farther, some manufacturers have added a pantograph attachment to the forks for the ultimate in narrow-aisle equipment. Such equipment can work comfortably in 6-foot aisles, stacking 1,000-pound loads at right angles to the aisle. Although slower and lighter than their big brothers, they have wide application where demands are moderate and loads relatively light.

- **The driverless tractor and train** is a "robot-future" development that is already commercially applicable. The Barrett Guide-o-matic tractor system can be used to dispatch individual loaded cars to remote points, where they are dropped and empties are picked up—all without the need for a driver-operator. Guidance and motive power for the tractor comes either from a single wire hung overhead or running in an inconspicuous groove in the floor or from a line painted on the floor that reflects light rays to light-sensitive devices within the tractor, which keep it "on the beam" as it moves along its path. Over-all control of the system is handled from a central programing panel where routings, stopovers, and pick-ups may be pre-selected in a few seconds. This type of equipment, which can operate effectively over long and circuitous routes, will undoubtedly be increasingly used in the future.
- **The unit load concept** is becoming standard practice. The idea is not new, but as the full potential of integrated handling becomes apparent, it is taking on new meaning. Materials and products are being moved in unit loads, not only in the plant and warehouse but over highways and railroads—and soon even by air.

The idea of a container of full trailer-truck size, separate from the rolling stock, opens up tremendous possibilities, not only for lowering loading and unloading costs, but for reducing breakage and spoilage. Full trailer-size, the cargo

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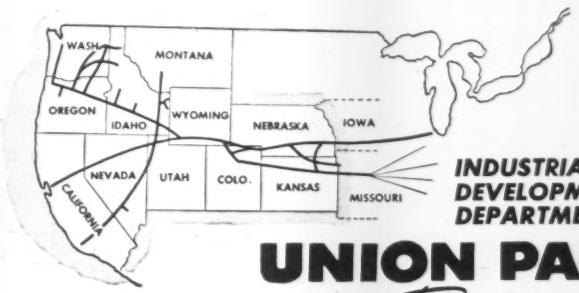

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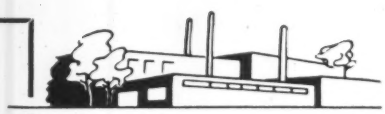

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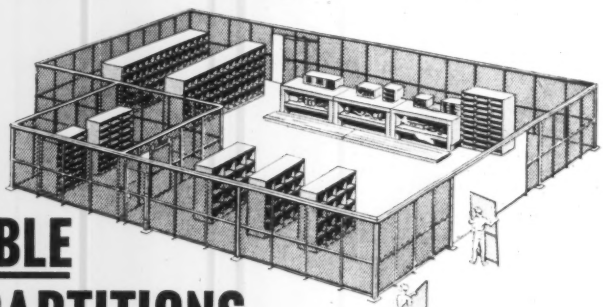

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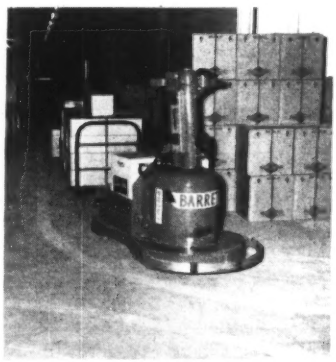

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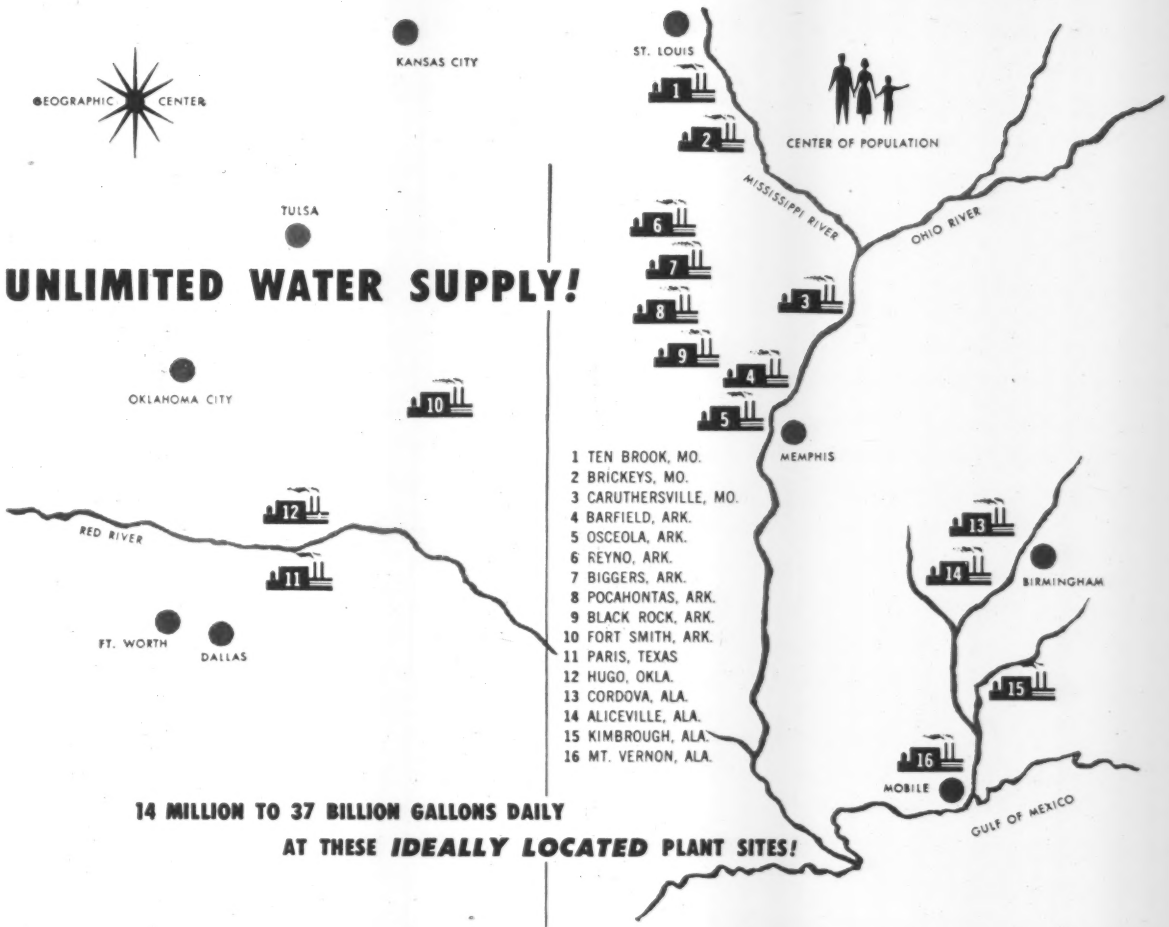
unit can be loaded and blocked for shipment at the output end of the production line, with a free choice of transportation media. The "packaged" cargo unit may be conveyed by railroad car to a seaboard point, picked up as a unit, and loaded aboard ship for overwater shipment. Each transfer between media is performed at fractions of the cost of manual handling. Other outstanding advantages offered by these sealed cargo units are protection against pilferage and elimination of special export packing.

● **Modern pallet-handling equipment** has helped greatly to sell the "unit load" idea. Plant-wide pallet systems now include automatic stackers (palletizers), unstackers for depalletizing incoming



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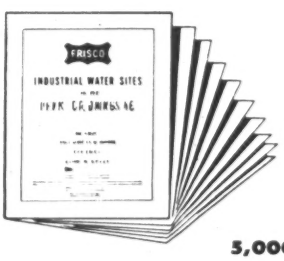

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loads, pallet conveyers, and automatic fast-acting floor-to-floor pallet elevators. The automatic pallet loaders available today can take as many as ten different packages from production lines, sort and stack them in any desired sequence, and forward the loaded pallet by conveyer to warehouse or shipping dock—all without manual effort. Systems like this can save as much as 90 per cent of the cost of manual stacking.

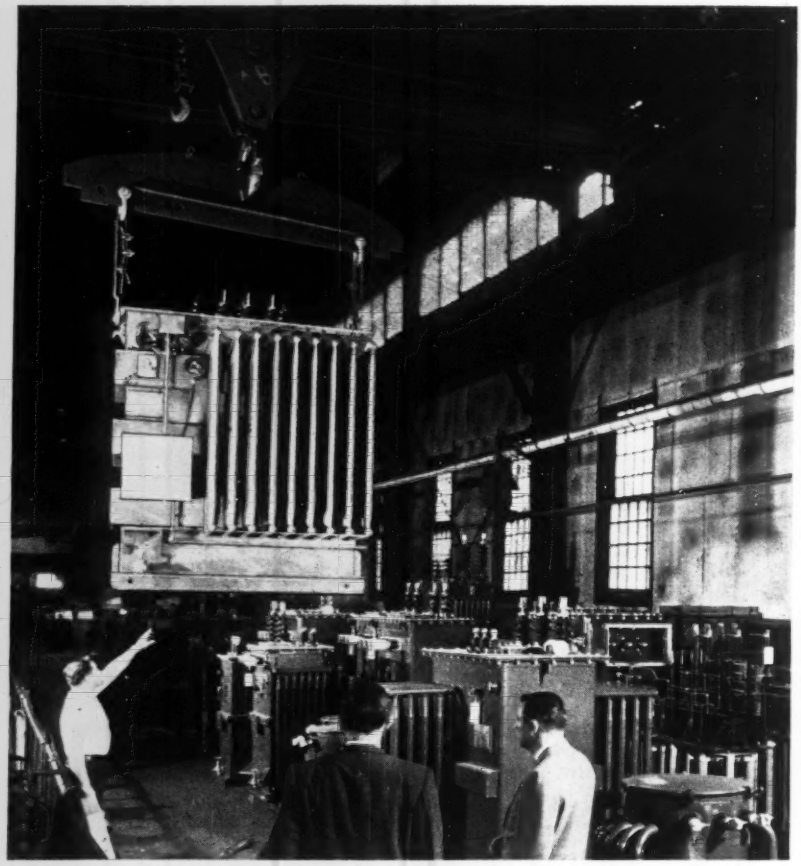
Here again, the integrated handling concept comes in. When all loading and unloading were done manually, the type of truck or railroad car was of minor consequence. The only requirement was manual labor—and plenty of it. For pallet handling, however, highway truck bodies must be suitable for handling pallet loads, and truck floor heights must coincide with loading dock heights, not only at the plant but at the customer's docks. To fulfil these needs, several kinds of adjustable-height loading docks are available, both hydraulic and electrically powered. Thus, in planning, visualization of every point where an obstacle might conceivably hinder the "flow" of the pallet load is essential.

The Pallet Problem

Pallet manufacturers are trying to develop standard pallet sizes, but the multiplicity of package sizes makes this difficult. Meanwhile, the relatively high cost of pallets, particularly when they cannot be recovered after shipment, is giving impetus to the concept of unit loading without pallets. This can be accomplished by using a fork-truck clamping arrangement for gripping and moving the assembled stack as a unit. Low-cost flat paper pallets are another possible solution to the cost problem.

Space does not permit review of all the developments that might be important to future planning. But here are a few idea sparkers: storage racks with "live" roller beds, for aisleless storage and automatic warehousing; highway trailers with similar "live" bottoms for loading and unloading pallets by gravity; pneumatic tube systems for unloading and conveying bulk materials; long-distance pipelines that can move coal and similar solids one mile—or a hundred miles—by hydraulic action. All these are available for the integrated handling system that will increase profit margins in the plant of tomorrow.

An obvious corollary to the integration of materials handling with plant design is the integration of the building and the handling system with all other related functions—for example, the production



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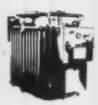
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process and related equipment. Materials handling, however, is a primary function and, in many situations, is almost as important to the success of an enterprise as the production process. It calls for extensive pre-planning when new building construction is being considered. Pre-planning, in this case, means that before you actually plan a new plant or any sizable plant expansion, you must decide who will participate in the actual planning and what factors are to be considered. At the pre-planning stage, capital limitations are assessed, a team is chosen, and goals are established. The actual planning of technical and other aspects should proceed only after this groundwork has been laid.

Expansion Made Easy

Because requirements may change over the years, recent trends in industrial building design have stressed flexibility —that is, adaptability to more than one use. Achieving such flexibility may require a higher initial investment, but it can pay off in a better profit position, to say nothing of a higher resale value for the building. Flexibly designed buildings can also simplify straight expansion later on. For additions should be possible without loss of original efficiency in production processes and materials handling.

To illustrate, a building that includes overhead crane facilities as part of the original design should not be cut off from expansion by the indiscriminate placement of heavy power plant equipment, L-shaped floors, lean-to additions, or the like. Similarly, in situating buildings on a plot of land, railroad right-of-way, access roads, and similar obstacles must not be allowed to prevent further straight-line expansion if production needs require it (see J&J case study, page 85).

On the other hand, the flexible building is not always the most efficient. Certain basic industries, particularly those doing continuous processing on a large scale, frequently have a definite need for specialized building design. In such cases, the building itself is actually a machine. A heavy volume of carloadings and unloadings, for instance, may dictate "stepped" or sloped floors to take economical advantage of gravity movement.

Specialized construction can cut operating costs and increase profit margins—but only if the stability of the product is assured. If not, amortization must be accomplished before technological advances or trade developments render these specialized buildings obsolete.

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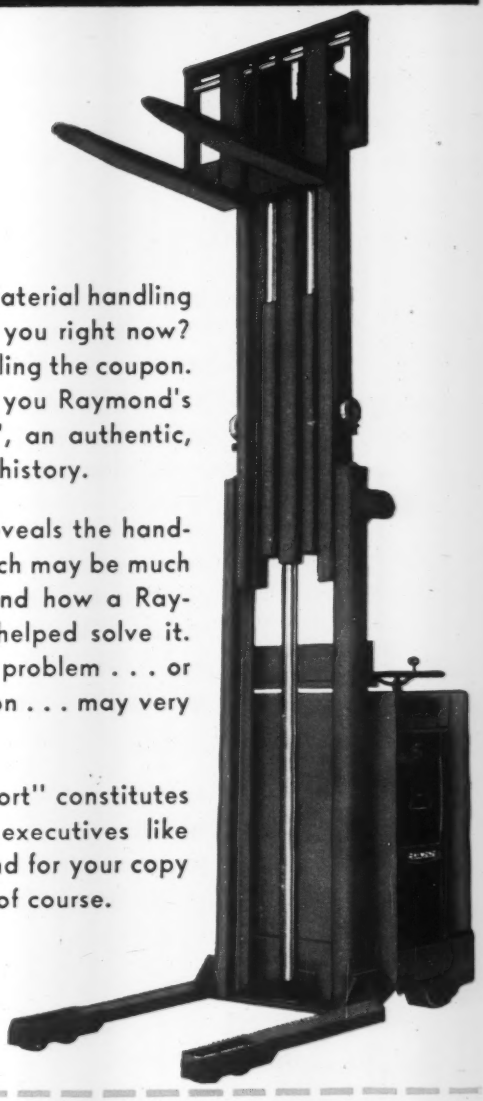

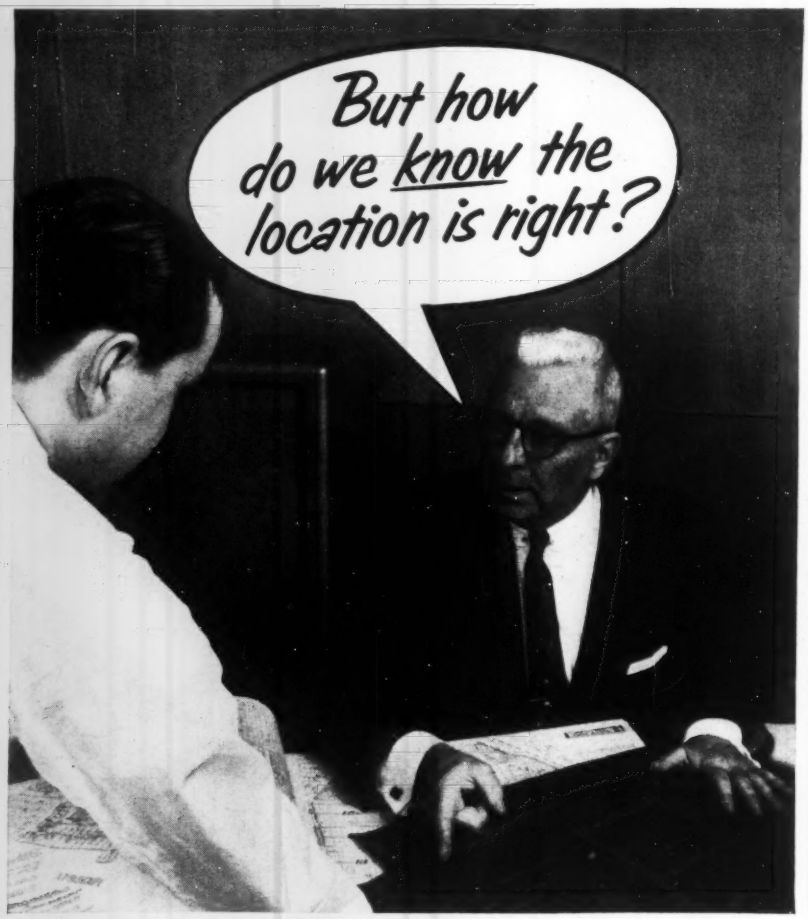

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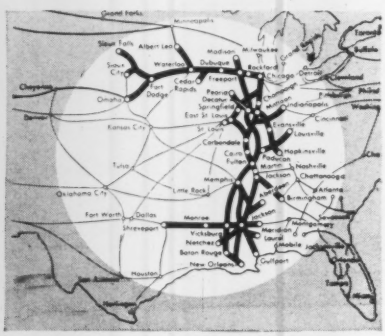

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specialized building design can be determined only after a complete analysis of all the foreseeable factors that might affect the functions of a building during the period of life expectancy. Many factors tie in with integrated handling.

- **Number of floors** is one factor. Generally, single-floor construction, with all activities on a single level, provides for lowest operating costs. Multi-floor buildings mean elevators, floor-to-floor traffic, and added exposure to the elements. All these contribute to higher operating costs. However, when these costs are considered in relation to volume of movement between floors and outside weather, they may not be decisive.
- **Ceiling heights.** The trend is toward greater height, because that is a good way to buy low-cost cubic footage for overhead storage space.
- **Door widths and heights.** They are being designed, in many cases, wider and higher than was previously thought necessary. Doors of 10- and 12-foot minimum widths are rapidly replacing the 8-foot door. These new wide doors open or close automatically.
- **Floor surfaces.** As heavier mobile equipment comes into use, floors must be given more consideration. Structurally, they must be adequate to handle the heavy, concentrated loads imposed by loaded fork trucks and similar equipment.
- **Structural framework.** This must be adequate not only to meet usual requirements but to support overhead conveyer systems and their loads.

Who Has the Answers?

The integration of the materials-handling function with other parts of the modern industrial enterprise is no easy task. Experience in World War II dramatized the importance of materials handling, and some larger companies now have a director of materials handling, or a staff engineer with equivalent title and function. But because the materials-handling function has only lately come of age, the average materials-handling engineer is relatively unseasoned in the field. He can, however, obtain much help from the manufacturers of handling equipment who have competent application engineers. In addition, engineering firms that have specialized in the subject can often bring valuable experience to specific problems.

Educational work has been going forward, with traveling clinics and related activities sponsored by the Material Handling Institute and the American Material Handling Society. END

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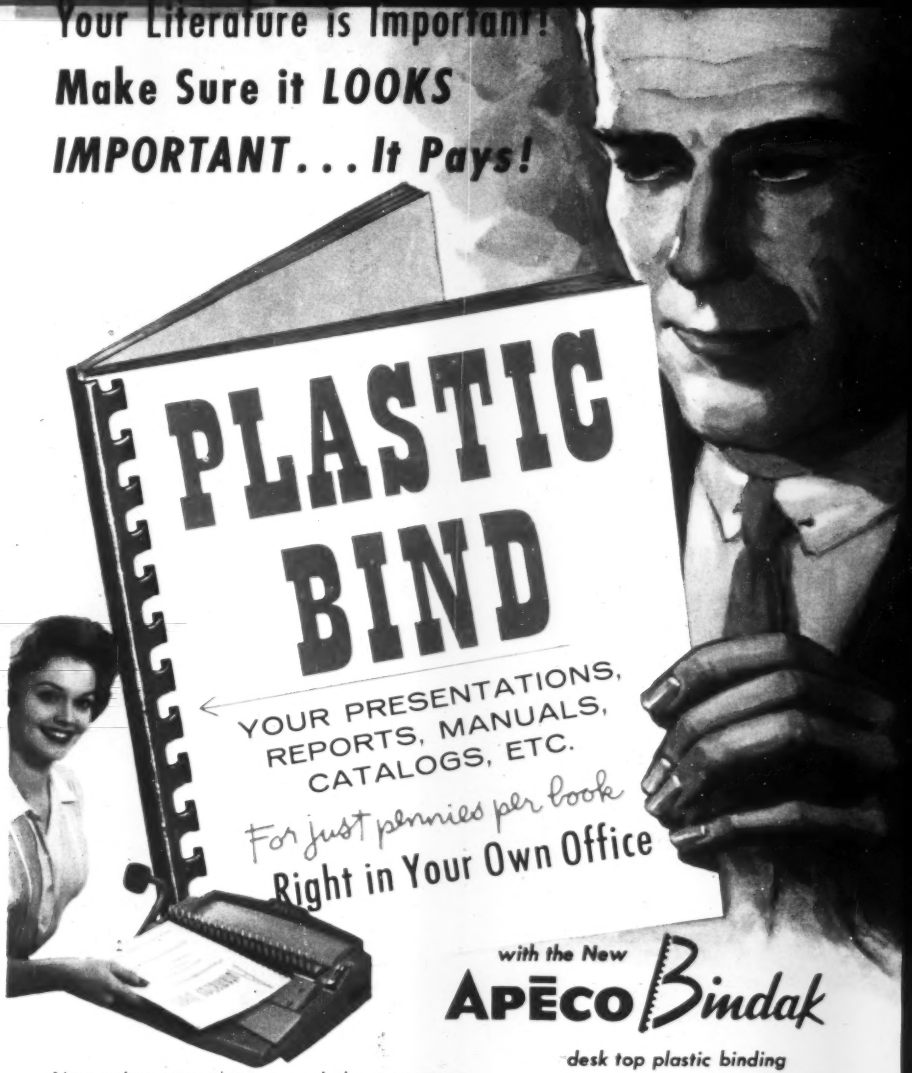

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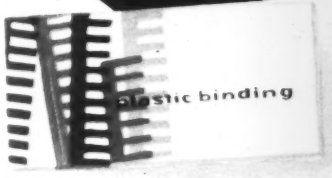

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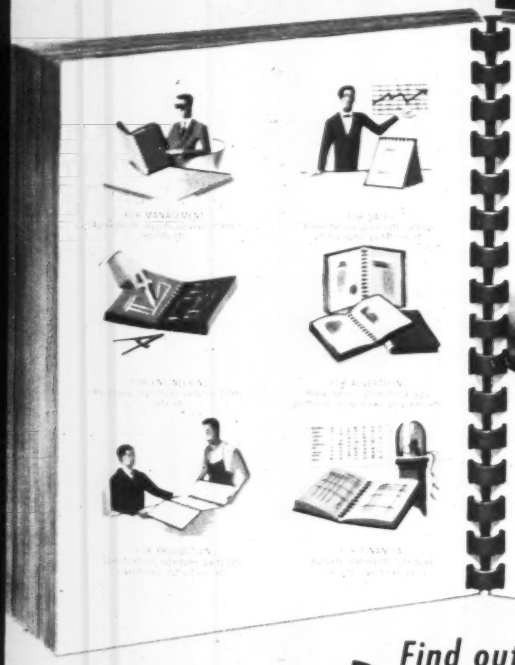
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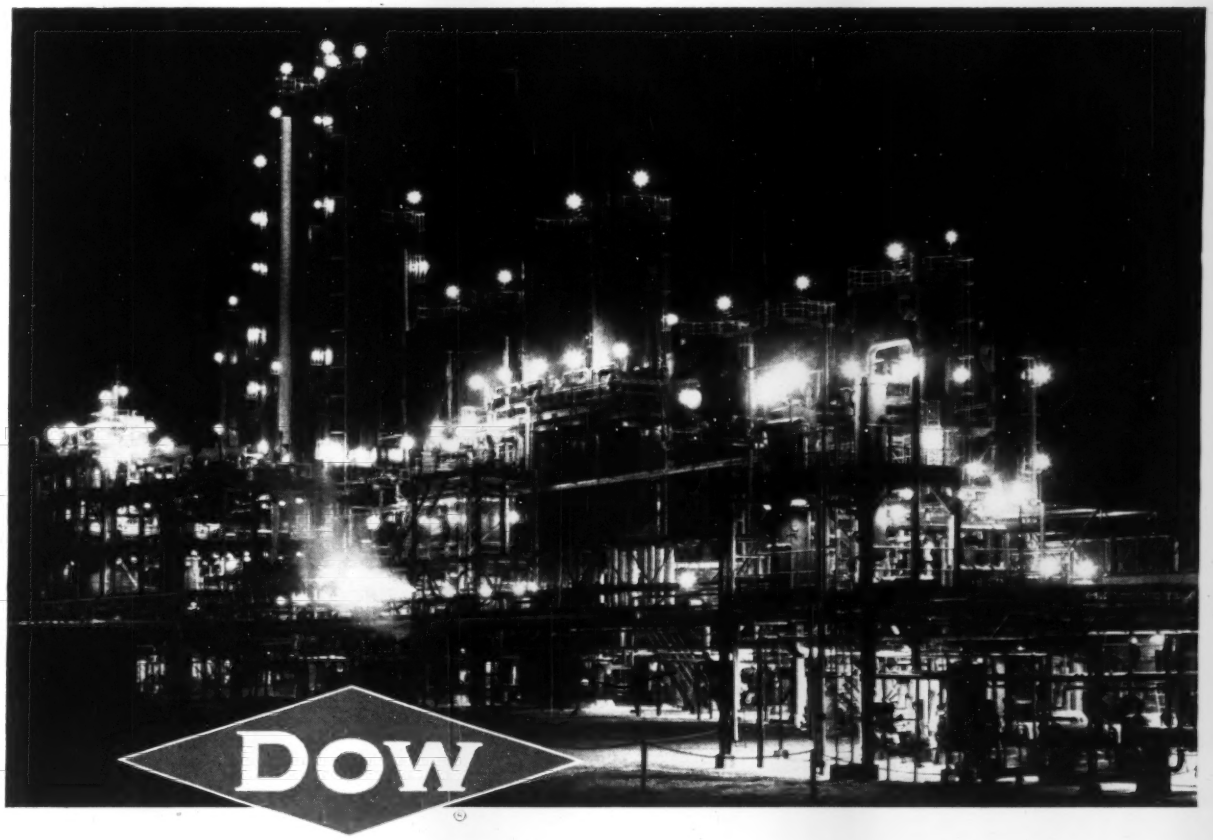

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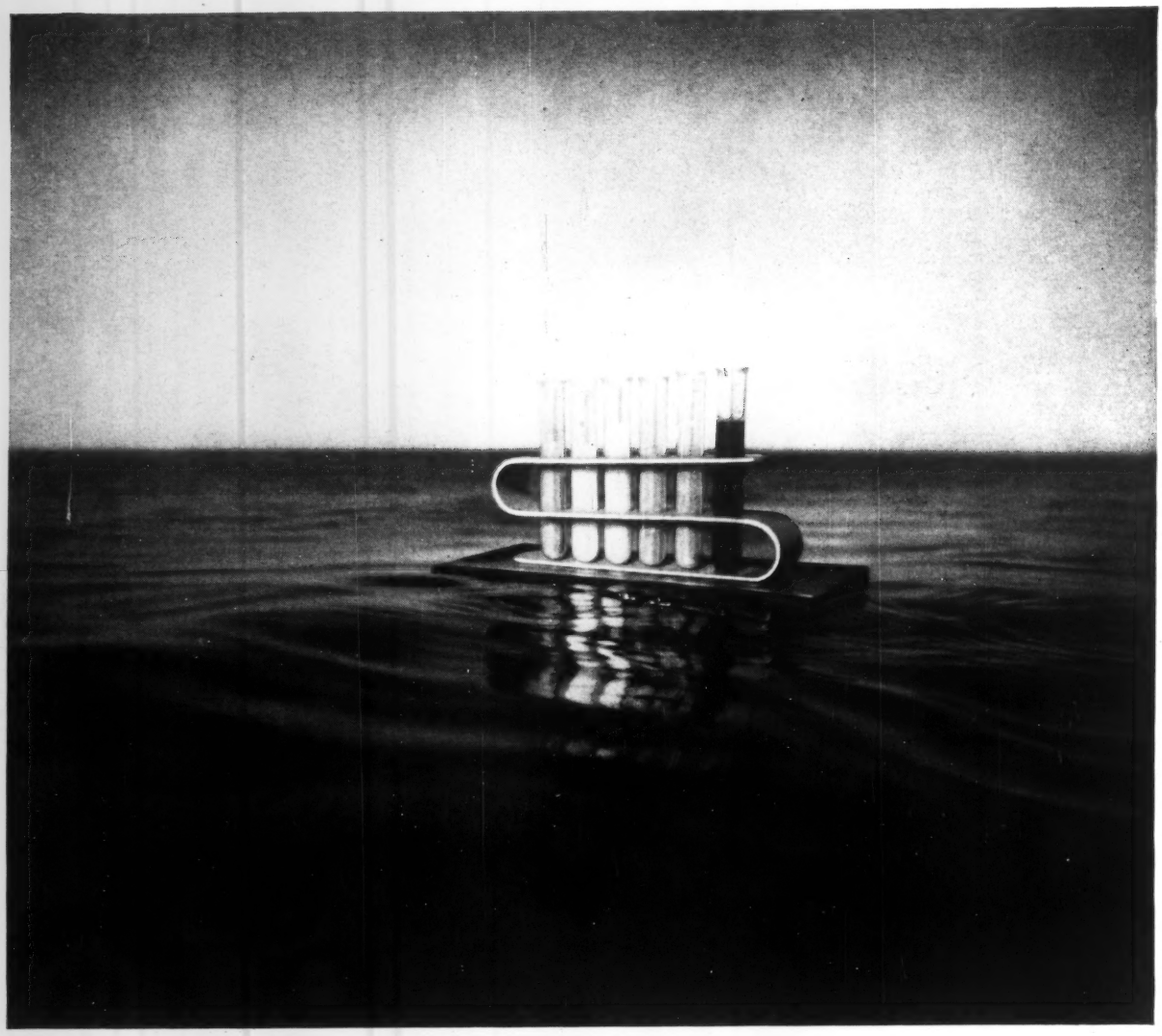

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PERSONNEL JOINS THE MANAGEMENT TEAM

As industry learns to make better use of its people all the way down the line, industrial relations men are gaining in status and influence.

AS SOMETHING of a Johnny-come-lately in industry—compared, that is, to established functions like sales, production, and finance—personnel or industrial relations has always been a bit uneasy about its status. Because they can't often point to solid, balance-sheet proofs of their achievements, plenty of industrial relations executives have had trouble convincing top management of the importance of their contribution to profits. And they have probably spent that much more time and energy convincing each other, in meetings and in print, that industrial relations "belongs on the top management team."

Where does industrial relations really stand today? How far has it progressed—if at all—toward that coveted niche near the top of the organization chart?

Influence on the Rise

Most of the recent evidence suggests that personnel men are doing pretty well for themselves and their departments, and that their influence in top corporate councils is decidedly on the increase. It's true that some personnel executives fear that they, along with the unskilled worker, will some day be automated right out of a job. But the majority see a bright future ahead, even though they sometimes complain that top management doesn't yet really understand the personnel function or give it the status in fact that it has achieved in theory.

For example, not long ago *Industrial Relations News* queried about 300 personnel men on their status and prospects. It found more than half felt that top management was convinced the department was a definite asset. Another 29 per cent thought management believed the function paid its own way. Only 12 per cent said that their departments were looked upon as a "necessary evil" or as "fire departments" useful only in times of crisis. But one in four complained that management infringed on industrial relations territory or expected it to handle problems not properly within its domain.

Similarly, in a survey conducted by the American Management Association—among a group of companies in which, generally, the personnel function rates high—personnel men voiced such complaints as:

- "Department heads take over the functions of personnel, particularly in hiring and quoting salaries and frequently in dismissing employees without consulting personnel."
- "The job lacks prestige because everyone from the janitor to the president of the company figures he is an expert in your field—but only you take the rap for composite bad guesses."

Measure of Success

On the organization chart, at least, the status of the department tends to be fairly high. About a third of the men who answered the *IRN* questionnaire report directly to the company president, and some of the others to management committees or boards of directors. In all but about 15 per cent of the companies covered in the AMA study, the department reported to the very top.

There is also a trend to larger personnel departments, as shown by the following figures from the *IRN* survey:

Staff increased in the past five years	54%
Staff remained the same	33%
Staff decreased	13%

These are objective measures—more dependable, perhaps, than the "feelings" the industrial relations managers may entertain about top management's viewpoint.

Judging by another objective measure, however, the department still has quite a way to go before it comes up to the level of production and sales. According to AMA compensation studies, the top industrial relations executive usually gets about 30 per cent as much as the company president, the top production executive about 50 per cent, and the top marketing man about 60 per cent (DR&MI, February 1958, page 115). The range in industrial relations salaries, however, is very wide. Another AMA study conducted last year showed salaries as low as $3,770 and as high as $55,000, with the median around $10,000.

IRN did not inquire into actual salary figures, but it did ask, "Do you feel your salary is in line with salaries paid for comparably responsible positions in other departments?"

Only 30 per cent thought that their salaries were not in line, despite the fact that a much larger group (56 per cent) said that industrial relations ranked below sales and production in management's eyes.

Many Roads

Most industrial relations men, incidentally, seem to have had experience in other departments. Both AMA and *IRN* studies indicate this. Only 15 per cent of the *IRN* group and 20 per cent of the AMA respondents had entered the field di-

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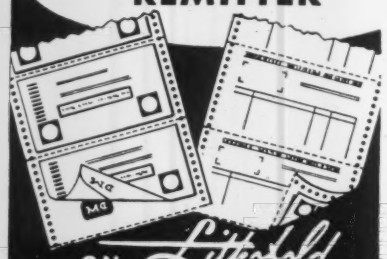

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rectly from school. The majority, in both cases, were in their early forties and had spent from five to ten years in other occupations.

Both surveys indicate that men in the field tend to be among the most highly educated management men. Nine out of ten in the *IRN* group held college degrees, and one out of three had an advanced degree. In the AMA group all but 20 per cent were college graduates, and those who lacked degrees were, for the most part, older executives. There were also a number who held advanced degrees. In contrast to this, a study of top management men, by W. Lloyd Warner and James C. Abegglen of the University of Chicago, found only 57 per cent with college degrees.

The *IRN* study showed that industrial relations executives with less than five years' experience most frequently have business administration degrees; those with five to ten years' experience, degrees in the social sciences; those with eleven to twenty years', degrees in liberal arts; and those with more than twenty years', degrees in engineering.

What of the future of these men, individually, and of their departments? The AMA survey throws some light on the first question, the *IRN* survey on the second.

Of the more than 400 industrial relations executives surveyed by AMA, nine out of ten planned to remain in the field. Of the one-tenth who hoped to move on, most were aiming for general management; only a handful wanted to move to sales or production.

Of those questioned by *IRN*, 85 per cent were hopeful about prospects in the field. "It will expand to infinity," one enthusiast wrote. "It will reach a par with sales and production," another man said. Others mentioned automation, union problems, and the complexity of industry as trends that are making for higher status for the personnel department.

More cautiously, some 6 per cent felt that the outlook is good if the department becomes more practical and abandons "fads and gadgets." Another 4 per cent believed that the big expansion is over, but that no contraction is likely.

Only 3 per cent, the smallest group, were pessimistic, for one reason or another. "If unprecedented prosperity levels off," said one, "less progressive firms will scrap the industrial relations program and more progressive firms will utilize it to increase their efficiency and improve position." Said another, "The future's not so good unless men in this field broaden their knowledge and raise their sights. Too many are only concerned with figures and methods, and too few about principles of management."

Even some of the pessimists, it appears, believe that industrial relations will have a bright future if it adapts itself to changing times. END

DISAPPEARING ACT

Day after day, year after year,
He proudly keeps his desk top clear.
No papers lie there, waiting action,
No letters seeking satisfaction,
No memo pads, no routing slips,
No rubber bands, no paper clips,
No candy bars that have one bite out,
No tickets for a coming night out,
No scorecards with a golfing score,
No crumbs from lunch two days before.
All these, however, if you'd know,
Are safely in the drawer below.

—RICHARD ARMOUR

PRODUCT TESTING
continued from page 42

rents from an electrical or electronic device doesn't tell much if the individual currents are not related to state, underwriter, or industry standards for prevention of shock.

The independent test laboratory plays a many-faceted and vital role in product testing and can be useful to all types and sizes of manufacturers. For the small company, it provides complete or supplementary test services, designs test procedures, or acts as a consultant when a company is setting up its own lab. For the large manufacturer, the independent lab handles temporary overloads, helps keep the company lab on its toes by checking its tests, and performs acceptance tests on large equipment (with seller and buyer often splitting the costs of the test).

Many manufacturers hire independent test services as a marketing aid. A tag bearing a seal of approval is attached to the product or a note is added to the brochure or catalog page. A reputable lab strictly controls this use of its name.

Consumer Testing

Another reason for careful product testing is the increase in testing by independent consumer groups, large retailers, and trade associations. The number of consumers influenced by Consumers' Research (Washington, N.J.) and Consumers Union (Mt. Vernon, N.Y.) is growing each year. A bad rating in the magazines published by these two organizations can cut sales among an influential group of urban buyers. A good rating can sometimes help establish a

SKILLED TECHNICIANS conduct tests of this Hamilton Standard (Windsor Locks, Conn.) aircraft fuel control on an elaborately instrumented test stand, with automatic recorders.

FOSTER D. SNELL

38 YEARS OF SUCCESSFUL NEW PRODUCT RESEARCH AND DEVELOPMENT

How to keep your BRAINCHILD from being a BUST

Is your brainchild a development of a new product? A competitively-inspired improvement of an existing product? Or is it being unduly delayed in development because of lack of sufficiently skilled technical manpower? If the answer to any of these questions is "Yes," why not utilize the combined talents of Foster D. Snell's 150 experienced consulting chemists, chemical engineers, bacteriologists, toxicologists and market researchers?

It can prove a most economical and speedy answer to your problem. The size of your operation is no bar. In fact, we specialize in working with smaller companies.

Foster D. Snell makes it possible for you to obtain "Research Without Capital Investment," or expensing research out of current income, as you can use us as your complete source of research or as an extension of your own laboratory for a week, month, year or as long as required.

Successful Procedure for New Product Development the Result of 38 Years Experience

38 years of diversified experience has resulted in Foster D. Snell being able to offer you the exceptional facilities of our laboratories and experienced talents of our staff to work on your brainchild. Our Product Development Departments include, among others, soap and synthetics, cosmetics and personal products, organic synthesis, fuels and lubricants, automotive specialties, protective coatings, waxes and polishes, inks, adhesives, chemical specialties, tobacco products, food products, textiles, pulp and paper, and packaging.

From this wide experience has come the basic facts which you should know prior to launching a new product development program, i.e.: a quick check of the market to determine the existence of a sufficient potential volume for the product, opinions of consumers as to preferences of your type of product and an assay of competitive products and practices. Such a survey can be made swiftly and economically by Foster D. Snell's Marketing and Economic Research Department. Your potential savings in stopping the development of your brainchild where there is no market, or a limited one, will more than pay for such a service.

Should your product show potential, then we are qualified to aid in more exacting market and consumer acceptance studies, in studying process economies for determination of economical plant size, estimated costs and potential profit or loss.

Periodic Review of Present Successful Products also Necessary to Continued Success

Just because you've got the "best one on the market" today is no reason why someone isn't going to have a better one on the market tomorrow. So it behooves every manufacturer to have a periodic check made of his product, as well as those of his competitors, to make sure that his remains best. Time and again we have seen successful products beaten out by a competitor because the maker of the leading product grew complacent.

Keeping on top of the heap is a continuing effort.

Take the First Step Now

If you are not one of the 8,000 who have received our booklet, send coupon now, for "HOW TO DEVELOP SUCCESSFUL NEW PRODUCTS." It tells you the 7 fool-proof steps to a successful product, points out the pitfalls to avoid in developing a new product, shows you how to cut your own research costs and get more results per dollar invested. MAIL COUPON BELOW, NOW, FOR THIS BOOKLET OR FOR LITERATURE ON YOUR SPECIFIC PROBLEM! Absolutely no obligation.

FOSTER D. SNELL INC.

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38 years of successful new product research and development

Send coupon before your competitor does. Beat him to the market place with a product that's better!

Foster D. Snell, Inc.
Dept. D-4, 29 West 15 St., New York 11, N. Y.

☐ I do not have booklet, "HOW TO DEVELOP SUCCESSFUL NEW PRODUCTS." Please send me *free* copy by return mail.

☐ My specific problem is.....
Please send me literature covering same.

Name.....

Title.....

Company.....

Address.....

reaching for

MORE SALES IN CANADA?

call on THE BANK *that's part of every part of Canada*

Whether you are planning to export into Canada or manufacture there, The Toronto-Dominion Bank can help you in many ways. With market figures, plant-site information, data on Canadian customs regulations and incorporation procedure . . .

"The Bank" can help you anywhere in Canada because, with 490 branches coast-to-coast, "The Bank" does business *everywhere* in Canada, knows all sections intimately.

Write or call us today. Let us tell you about all the business-building services of The Toronto-Dominion Bank . . . services we're ready to put to work for you now.

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New York Agency:
28 Broadway, New York 4, N. Y.

BANK

stronger demand for a new product.

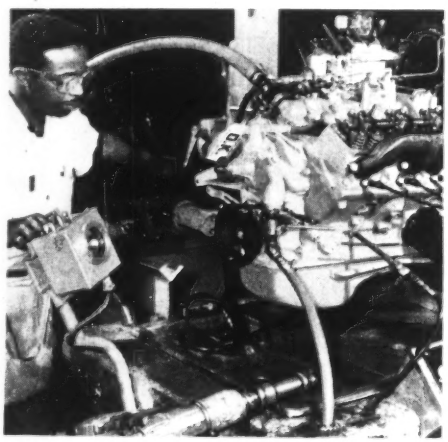
If a manufacturer receives a bad rating from one of the consumer test magazines, he needn't sit stewing. Frederick J. Schlink, head of Consumers' Research, is quite willing to talk over the rating and suggest changes to improve the product. The lab machines and test methods of Consumers' Research have been adopted in many instances by industry. Similarly, if any manufacturer questions the test results of Consumers Union, he will receive a complete test procedure on request.

If a manufacturer receives a good rating from the testing magazines, he is not permitted to publicize the fact or use the names of these organizations in his ads. But some companies have been getting around this prohibition by buying a number of news-stand copies of the magazines and giving one to each distributor or door-to-door salesman.

Testing by Retailers

Dealing with the test labs of the giant retailers is another matter. Here, huge orders are involved. Recently, one of the big mail-order houses had to settle a claim for $120,000, because a power tool it sold fatally shocked a user. Manufacturers can expect these retailers to rely even more on their test labs.

The test procedures used by these labs are also available on request. R. H. Macy's Bureau of Standards, which tests for the nation-wide chain of stores associated with Macy's, frequently confers with the manufacturers of goods it tests, according to



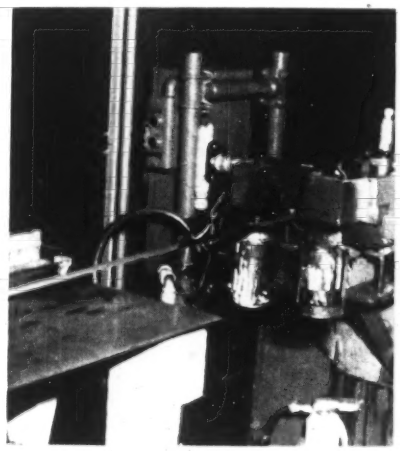
VIBRATION TEST: Each Ford motor is tested for excessive vibration and balance with strobe system designed by International Research & Development Corp. in Cleveland.

Daniel Chaucer, laboratory manager.

Trade associations are also becoming more aware of testing (although none has gone so far as the Japanese camera industry, which has set up a lab to test and certify each lens). The Air Moving and Conditioning Association, for example, inspects the test laboratories of member companies. Companies whose labs are approved are given the right to attach a seal to their products.

The Future of Testing

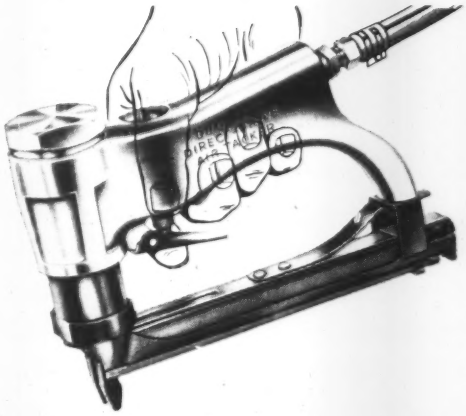
If, in the future, computers are for the most part directing high-volume plant operations, it's only



ELECTRONIC AID: This copper tubing runs through the sensing element at hundreds of feet a minute. Yet whenever the wall thickness falls below specs, an electronic circuit drives an aerosol can to squirt blue dye on the defective portion. Magnaflux Corp., Chicago, built the test stand for the Cleveland plant of Chase Brass & Copper.

reasonable to assume that considerable high-volume product testing will also be run by computers. Already, test data collected during the flights of new missiles and aircraft are computer-analyzed. But as testing grows inevitably more complicated, experienced and resourceful test directors will be increasingly in demand and increasingly hard to come by—a reflection of the general shortage of good technical people.

Good product testing costs money and takes time. Even so, it doesn't insure perfect performance. Nor does it replace field testing or proper operation and good maintenance. But it's still a lot cheaper than replacing guaranteed parts, taking back the merchandise, or losing customers, a lawsuit, and your reputation. END



Your plant, too, can cut costs with DUO-FAST Automatic Stapling

Shown here are just 4 of the many ways DUO-FAST Automatic Stapling is reducing costs for others. Yes, and you, too, can save with DUO-FAST.

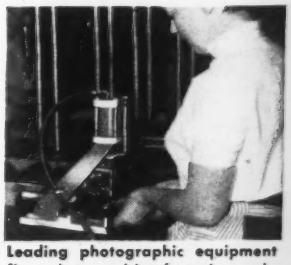
The first step? Simply *analyze* your present fastening methods . . . particularly those now being done with brads, screws, tape or glue. You'll find mighty few that can't be done faster, neater or easier with a DUO-FAST Stapler or Tacker.

Let your nearby DUO-FAST Representative help you make this analysis now. With over 150 staple-tacking models to draw on, he can show you the safe, accurate, *automatic* way to streamline your fastening methods.

Free maintenance. And remember: DUO-FAST tools carry our famous Free Service Guarantee. For a Free 28-page Manual of ideas you can use, return the coupon below.

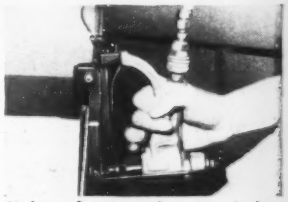
DUO-FAST

Staplers • Tackers • Staples



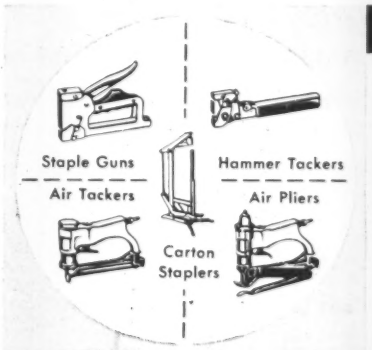
Leading photographic equipment firm solves precision fastening problem at lower cost with new DUO-FAST Bench Stapler. Air-operated tool leaves both hands free.

World's largest automobile manufacturer speeds production by tacking body interiors with DUO-FAST Air Tackers. The skill and accuracy are built-in.



Maker of automotive accessories "ended customer complaints" by stapling large, unwieldy cartons with DUO-FAST Air Pliers. Provides better packaging at lower cost.

Metal can manufacturer lines boxcars faster with speedy DUO-FAST Hammer Tackers. Shipping Manager calls it "the best and easiest method!"



New Ideas for you!

FASTENER CORPORATION
3758-68 River Rd., Franklin Park, Ill.

Without cost or obligation, please:

☐ send DUO-FAST Staple-Tacking Manual.

☐ have a DUO-FAST man call on us.

Name_____

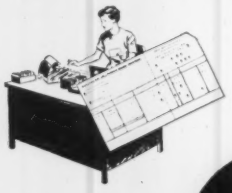
Firm_____

Address_____

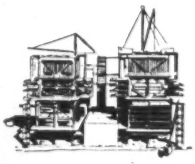
City_____ Zone___ State_____

8074

SOUTHERN CALIFORNIA EDISON COMPANY



62nd Annual Report



REVENUE AND SALES

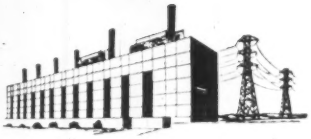
Gross Revenue rose to $218,818,527 or 11.4% over 1956. Net income declined 5.2% to $31,567,303, due to inflated operating costs, below average water conditions and the high cost of new capital.

PLANT EXPANSION

Electric plant investment increased $119,847,480 during 1957 to $1,134,163,132. Two steam units were completed, each with 175,000 kw capacity. Five new generating units are under construction.

CUSTOMERS

Total meters on the Company's system passed the 1.5 million mark. The 66,557 additional meters connected in 1957 was equivalent to the requirements of a community of nearly 200,000 people.



GENERATION

Electric energy transmitted of 15 billion kwh was more than twice the amount transmitted ten years earlier. The annual system load factor was 65.2% compared with 63.1% in 1956.

FINANCING

Through the sale of three issues of First and Refunding Mortgage Bonds, $117,326,875 of new money was obtained during 1957 at the highest bond money cost prevailing in 25 years.

Southern California Edison Company continued its dynamic program of expansion in 1957 by investing more millions than ever before in new electric plant and equipment.

Although 1957 was a year in which many new records were established, earnings per common share declined from $3.39 in 1956 to $3.03, emphasizing the need for a rate increase. New rate levels authorized by the California Public Utilities Commission October 15, 1957 became effective November 9, 1957. The new rates were designed to produce a rate of return of 6.25% on a depreciated book-cost rate base and to provide additional revenue of $25,000,000 annually at the 1957 estimated sales level.

A license was issued by the Federal Power Commission on December 30, 1957, and authorization of the California Public Utilities Commission was received on January 21, 1958 for the construction of the Mammoth Pool Hydroelectric Project. Additional generation at Mammoth, plus re-use of the water downstream, will provide an average annual increase of 636 million kilowatt-hours at the Company's Big Creek-San Joaquin River Hydroelectric Development.

Under a contract with Atomics International, a division of North American Aviation, Inc., the Company has installed generating equipment adjacent to an experimental sodium-graphite nuclear reactor near Santa Susana. Electric power was produced from this source and distributed to Edison customers on July 12, 1957. This was the first time that a privately-owned electric utility generated and distributed electric energy on a commercial basis from a non-military reactor.

CONDENSED CONSOLIDATED BALANCE SHEET

December 31, 1957

ASSETS		LIABILITIES	
Electric Plant	$1,134,163,132	Stated Capital and Surplus	$ 456,374,643
Investments & Other Assets	9,674,433	Long Term Debt	510,213,000
Current Assets	96,156,986	Current Liabilities	69,351,687
Deferred Charges	4,519,674	Depreciation Reserve	183,746,125
Capital Stock Expense	3,208,150	Other Reserves & Liabilities	28,036,920
TOTAL ASSETS	$1,247,722,375	TOTAL LIABILITIES	$1,247,722,375

SOUTHERN CALIFORNIA Edison COMPANY

EDISON BUILDING • 601 WEST FIFTH STREET — LOS ANGELES 53, CALIF.

To train dealers' servicemen, J. I. Case Company uses two tractor-trailer units.

SELLING ON WHEELS

As selling gets tougher, some companies are using truck-borne showrooms to attract customers and step up sales

LIKE THE nineteenth-century Yankee peddler, many companies are taking their wares to their customers. And they are discovering that the properly used mobile unit can perform a variety of tasks, all of which add up to increased sales.

For instance, the Firestone Tire & Rubber Company, Akron, Ohio, uses four giant (35-foot-long) trailers in its sales training program for employees of Firestone dealers and stores across the nation. The house-type trailers are outfitted with motion picture and slide projectors, pictorial displays, and various products under study.

The four mobile units replaced fourteen district training schools that were used to train 800 retail salespeople each year. Last year ten times as many sales students—8,000 in all—were trained, at one-sixth the per-capita cost of the old system.

Firestone measures the effectiveness of the program by checking students' sales records two weeks before and two weeks after the training sessions. The company reports "an impressive across-the-board improvement throughout the country."

According to sales training director James C. Young: "Results have been almost unbelievable. After a few hours of classroom instruction in the mobile unit, some employees' sales jumped as much as 150 per cent. We credit some of this success to the fact that employees like the idea of getting instruction in their own territories where they can be home at night and remain close to their jobs. Sales personnel in our stores formerly traveled long distances to reach the nearest training school. Sometimes the round trip would take several days, leaving stores short-handed."

The J. I. Case Company, Racine, Wis., uses trailer units to train dealers' employees in maintenance and service techniques for Case tractors, rather than in sales methods. Company technicians present three-day courses, using actual and mock-up tractor assemblies for demonstration.

Case says that there is nothing fancy about these service schools. Classes are held in a dealer's service department, and students are encouraged to wade in and get their hands dirty.

Important features of the school

TO IMPROVE SELLING to industrial plants with several buying groups, the Scott Paper Company, Chester, Pa., is now testing this 40-foot air-conditioned trailer, which is equipped with movie and slide projectors, paper towel dispensers and products, and a sink with hot and cold running water for product demonstrations.

TO FAMILIARIZE ENGINEERS with the application of fluid power, the Flick-Reedy Corp. of Melrose, Ill., has four buses servicing customers' plants across the nation. Equipped as a classroom, each bus has seats for eighteen students who are taught the fine points of cylinder operation and maintenance by a Flick-Reedy technician.

Heavy Duty Bench Type
ALLEN
PUNCH PRESSES

Model B-2-A
2 Ton Half Press
$84.50 fob

POWERFUL
DEPENDABLE
ECONOMICAL

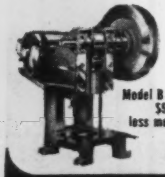
164 Different
Model Combinations

1 to 5 Ton
Capacities

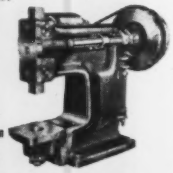
Fully Guaranteed

See your Supply Dealer or write for Catalog giving complete information, specifications and prices on our line of Bench Type Punch Presses.

Model B-5 — 5 Ton
$199.50 — less motor — fob



Model B-2 — 2 Ton
$87.50
less motor — fob



Model LTX — Special Duty
1 Ton — $89.50 less motor — fob

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Visi-Shelf

can increase your present filing capacity by almost 200%!

OVER 4,000 VISI-SHELF INSTALLATIONS IN ALL PHASES OF AMERICAN BUSINESS SINCE ITS INTRODUCTION A FEW YEARS AGO!

America's First and Foremost Shelf Filing System with —

more FILING CAPACITY — Visi-Shelf units are available with from 7 to 10 openings High (or up to the ceiling if desired)!

more RECORD PROTECTION Patented, light-weight Doors available on all Visi-Shelf units!

more FILING PRODUCTION Visi-Shelf's exclusive "Facile Guide Pull" provides more accurate filing, quicker reference!

Visi-Shelf FILING SYSTEM

Write today for free catalog and name of nearest dealer.

VISI-SHELF FILE, INC.
225 Broadway, Dept. C-4
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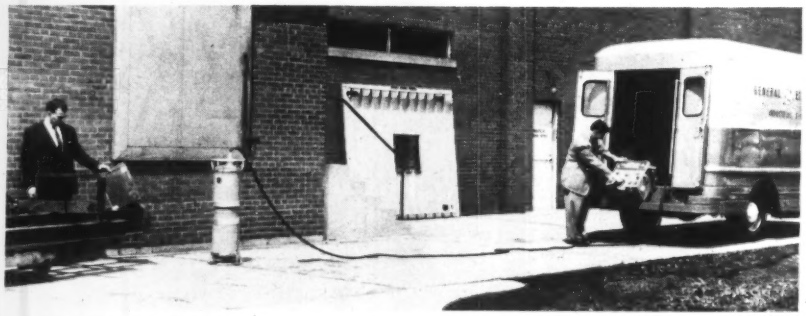
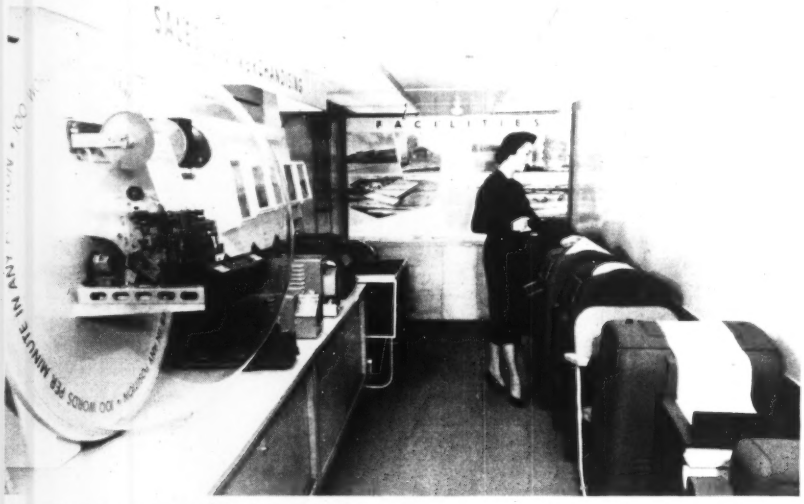
Selling on Wheels



TO DEMONSTRATE PRODUCTS on industry's doorstep, General Electric's X-ray Department sends its "Inspectobile" unit. Sales engineers show how industrial X-rays can be used to examine welded joints. The X-ray source, standing on end, is aimed at the joint as an X-ray plate is placed behind it and the technician (right) sets dials for proper exposure.



TO SHOW CUSTOMERS AND PROSPECTS new products as well as an integrated data processing installation actually in operation, the Teletype Corp., Chicago, is sending a 35-foot-long van (interior view above) all over the country. It enables the sales engineer to take his showroom along with him when he goes out to sell complete data processing systems.

TO SHOW DISTRIBUTORS its new line, Moe Light of Fort Atkinson, Wis., sent four large tractor-trailer units, designed as lighting-fixture showrooms, to 65 cities. Sticking to tight schedules, the units reached most of the company's 200 distributors at about the same time. The distributors, in turn, invited dealers, contractors, architects, and decorators.

are a session for discussing special problems in particular geographic areas and a written examination in the subjects covered. Dealers are given the results of the test so they can evaluate their service employees.

The Case training program is not a one-shot affair. The training units will visit dealers at regular intervals to cover different angles of the servicing story. One trailer is visiting dealers throughout the Midwest and Far West; another is busy in the East and South.

Check the pictures for other ideas on how to sell on wheels.

Many Spiels into One

To meet the common problem of multiple buying authorities in customers' plants, the Scott Paper Company of Chester, Pa., is testing a mobile unit. It is now stopping at plant doors in all 48 states. According to Scott, the mobile unit will end the confusion of shuffling from one buying and specifying group to another in a large plant to tell the sales story for towels and industrial wipers over and over again.

The mobile selling unit is equipped to seat seven persons. These generally include a Scott executive, a distributor's salesman, and five people from the prospect company. Scott reports that prospects are attracted to the unit because it offers a pleasant change of pace in the workday—away from telephones, secretaries, and office routine. The advantage to Scott is even more prominent: prospects can give their complete attention to the sales presentation.

The traveling exhibit is a salesman's dream-come-true. It eliminates the need to haul projectors, display literature, and sample cases into the prospect's plant and from office to office. All the sales aids are at the salesman's finger tips in one central location where the entire buying group can come together at one time. Scott says that with this set-up the distributor salesman is on home ground, so to speak, and hence is in a better position to control the selling situation and maintain sales initiative.

The company reports that the preliminary results of this unusual selling program are better than expected and that the very approach of the mobile unit in some areas has brought inquiries from prospects.

—T.K.

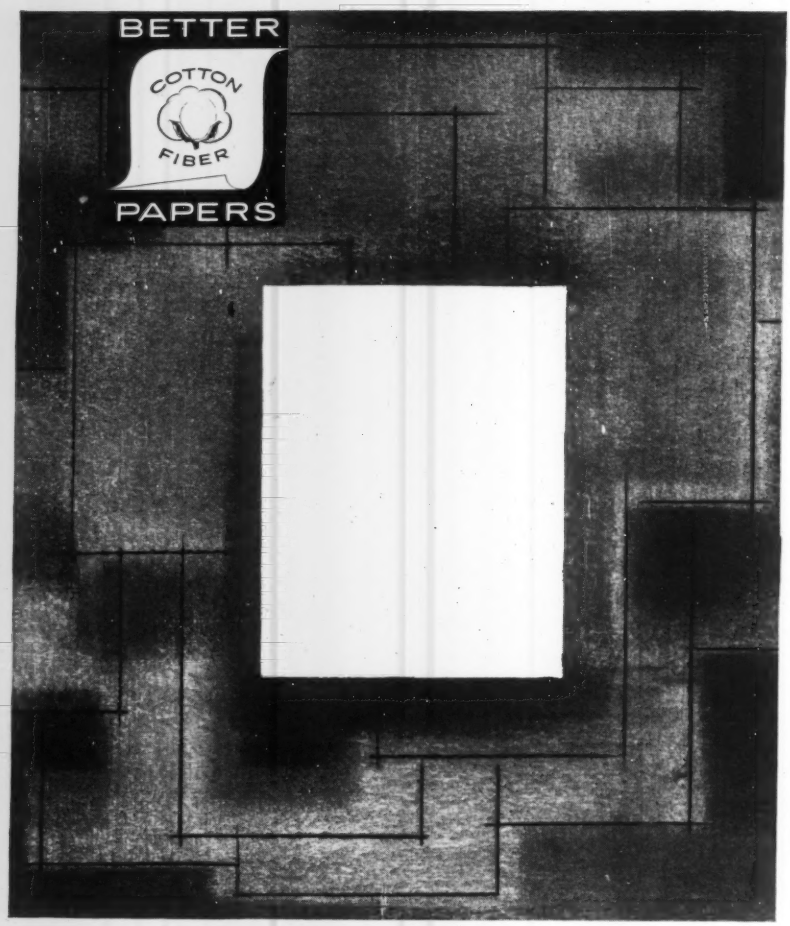
When you ship, title passes, and your credit risk begins

At the time of shipping, you create an account receivable . . . and unless you have credit insurance . . . your insurance protection ceases. You lose control of the asset because title of the merchandise has passed. It is sound to insure your product while you own it . . . it is equally sound to insure it when your customer owns it . . . and owes *you* for it. Aggressive executives, through American Credit Insurance, continue protection of their working capital and profits invested in receivables. It is an important tool for constructive credit management. Our booklet on the many ways credit insurance contributes to financial security and sales progress should interest *you*. Write AMERICAN CREDIT INDEMNITY CO. of New York, Dept. 50, 300 St. Paul Place, Baltimore 2, Maryland.

Protect your capital and profit invested in accounts receivable with

American Credit Insurance

ANY ACCOUNT . . . NO MATTER HOW GOOD . . . IS BETTER WITH ACI



QUALITY THAT STANDS OUT
At A Cost You Hardly Notice
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SALES SUPERVISION
continued from page 45

ful sale. This is the morning-after idea. The "banzai" effects of the sales meeting may be dissipated by a successful charge against the customer-enemy, leaving doubt and fear naked and exposed. But whether this ever happens to jazzed-up salesmen is not easy to discover.

When a salesman feels emotional conflict, he works, consciously or unconsciously, to resolve it, even without the sales manager's help. During days spent traveling with salesmen, I have observed that one common way some of them compromise with conflict is by sticking with "safe" customers and avoiding the others. By spending most of their time with that special customer group, they can feel they are doing their job and, at the same time, minimize psychological stresses. They make peace with some of the enemy, and then they stay within this friendly enemy area. The hot sales meeting will have to be hot enough to stir salesmen to the point where they are willing to make a hell-for-leather charge into unknown territory.

Hot management is also faced with the necessity for frequent renewal of stimulation. It's hard to keep salesmen keyed up over a long period if they have underlying negative feelings—except by giving them repeated emotional shots in the arm, perhaps even shots of continuously increasing intensity.

But if these are weaknesses, they are not necessarily fatal. The jazzed-up salesman may be successful in getting over the hump. He may find that he can sell and get away with it, that the bogies were all in his mind.

Cooling Off by Degrees

Making hot sales supervision serve its purpose well may not be easy, but it seems possible—if sales managers work at it.

But there's the rub. Many things are making it increasingly hard for sales managers to lay out and follow a clear and consistent hot supervisory policy.

One is the rapidly changing picture of management elsewhere in the company. The rest of management seems to be going "cool." Jobs that used to be flown by the seat of the pants are falling into the hands of

technical specialists. Elaborate quantitative techniques are coming into use, even in fields very close to the sales supervisor's own bailiwick, like market analysis and research. The individual is giving way to the committee. Personalities are giving way to impersonal, institutional policies and practices. Cooperation is being emphasized, as tasks become bigger and more technically complicated. The rest of management even seems to be getting politer with competitors. Professional ethics and the social responsibility of the manager are now being talked about more and more.

It is not surprising, therefore, that the hot sales manager feels some pressure. He feels it as he thinks about his own future in his organization, and he feels it as he tries to maintain his emphasis on "getting that order."

He has the changing social attitudes of Americans to contend with, too. Young people, especially better-educated ones, often seem to look down on selling.

So it is not surprising that the hot sales supervisor is making compromises, trying to cool off by degrees—but against his will.

Problems of Compromise

The consequences are peculiar and sometimes even singularly unsuccessful.

For instance, the supervisor may try to hire as salesmen precisely the people who will create problems—the "respectable" young men who are inordinately worried about their self-esteem and security, who are doubtful about selling, and who have to be fired by the application of very great heat. Company attitudes, and perhaps his own doubts, seem to prevent the sales manager from looking for people with more flexible, individualistic beliefs—old-time-type salesmen who are frankly and unashamedly after the money, and who are not easily frightened off by tough customers.

Under pressure, too, the hot sales manager is apt to use precisely the technique he knows best—heat—to try to relieve the pressure. So he uses heat to prove his profession's respectability. He gets together with his colleagues at big rallies, where they can tell the world and one another they are respectable and important and professional.

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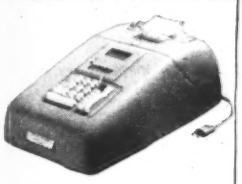

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He also tries, often half-heartedly, to adopt new managerial techniques developed elsewhere. He tries to use his sales meetings for "discussion groups" and conferences, as well as for inspiration. He may try to become a counselor and therapist, as well as a stimulator and needler. He may even try to evaluate the effectiveness of his salesmen by their "good will" and "cooperativeness," instead of by the vitality and success of their selling efforts.

More and more, sales supervisors are caught up in such undifferentiated confusion, trying to follow all the popular dicta at once. Some of them want to be human relations modernists and, simultaneously, to revive the good old days of individual initiative. They want to be carnival barkers and psychiatrists at the same time. They want their men to get out and fight for the sale, but they want them to be tightly controlled. They want intelligent, upright young college graduates, but they also want men who see the prospect almost like an enemy in an all-out war. As a consequence, inconsistencies creep into hot sales management. "Participation" is becoming almost as popular a byword in the sales world as "inspiration."

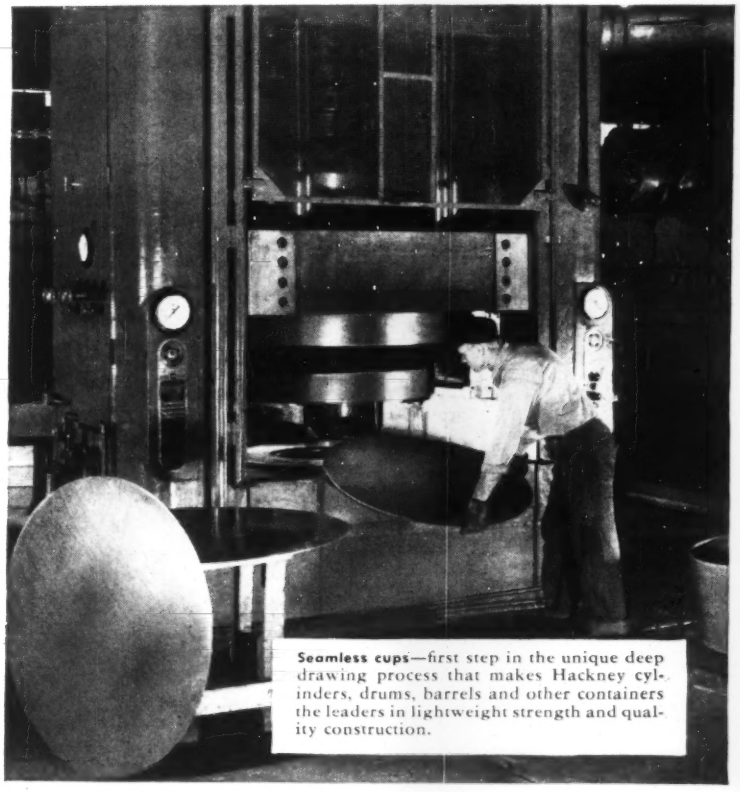
One Alternative

Hot sales supervision *does* make sense if it is carried on as part of an internally consistent pattern—a pattern that calls for selection of relatively tough-skinned, financially ambitious, and individualistic people, for financial payoffs tied directly to sales performance, for jazzed-up sales meetings to keep salesmen aggressive and single-minded in pursuing their objectives, for training designed to help them win the war with the customer-enemy.

But many conditions in the changing business world and in changing companies are making it harder to hang on to whole-hog hot sales supervision. Since compromises tend to do more harm than good, what alternative is there?

One answer would seem to be a kind of "cool" supervision. A sales executive running his department on these lines would:

- Select selling candidates for things like their ability to cooperate, their potential loyalty to the company, their high standards of morality, the breadth of their interest in things



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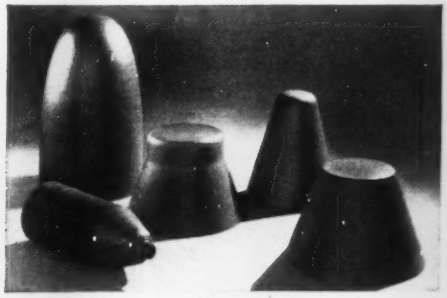

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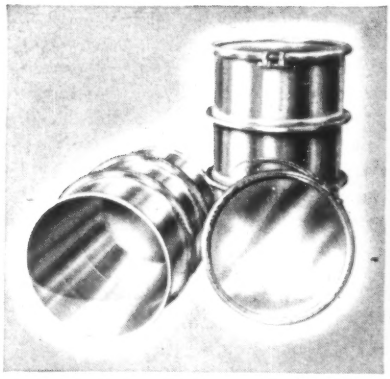

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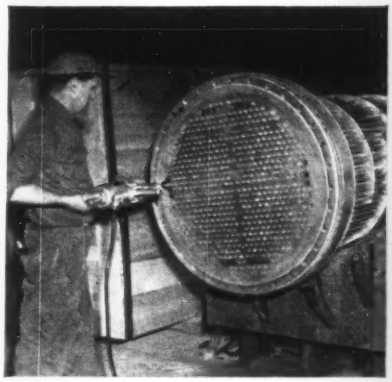

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nonfinancial, as well as basic aptitudes and skills.

- Try to set up a cooperative, team atmosphere, perhaps using salaries alone, or salaries plus *group* incentives, group-planned merchandising programs, and so on.
- Use meetings to let salesmen talk directly about their own problems. Encourage them to discuss their feelings, their fears, their doubts. Take an "objective" position about company products, frankly discussing weaknesses as well as strengths, and planning with their salesmen to meet criticisms they may encounter. They would never use meetings to push salesmen.

Likewise, training would first work technically, at providing knowledge and information, and second therapeutically, at helping salesmen to resolve their conflicts by talking them out in a "supportive" and sympathetic supervisory environment. Moreover, a salesman would be taught that his customer is a friend, not an enemy, that the customer's problems come first, and that a salesman shouldn't push a sale if he feels qualms about it.

General day-to-day supervision would aim at supporting the salesman, keeping his morale high, encouraging him to talk out his problems, no matter how unsalesmanlike they might be. The supervisor would become a counselor rather than a stimulator.

I know of no real company in which such "cool" management has been *consistently* applied, successfully or otherwise, in the selling end of a business. But it is very close to the kinds of policies that have been gaining a foothold in other realms of management. Clearly it would be risky.

Hot supervision, with appropriate selection, training, oratory, and day-to-day control, makes sense, and has experience behind it. The hypothetical "cool" pattern, also accompanied by appropriate selection, incentives, and supervisory practices, makes sense, too. And though this approach has not been subjected to the tests of experience, it may well turn out to be an experiment some companies will feel forced to make in the next decade, if current pressures continue to build up. In any case, it's a good guess that either policy, hot or cool, would succeed better alone than in hectic, inconsistent competition. END

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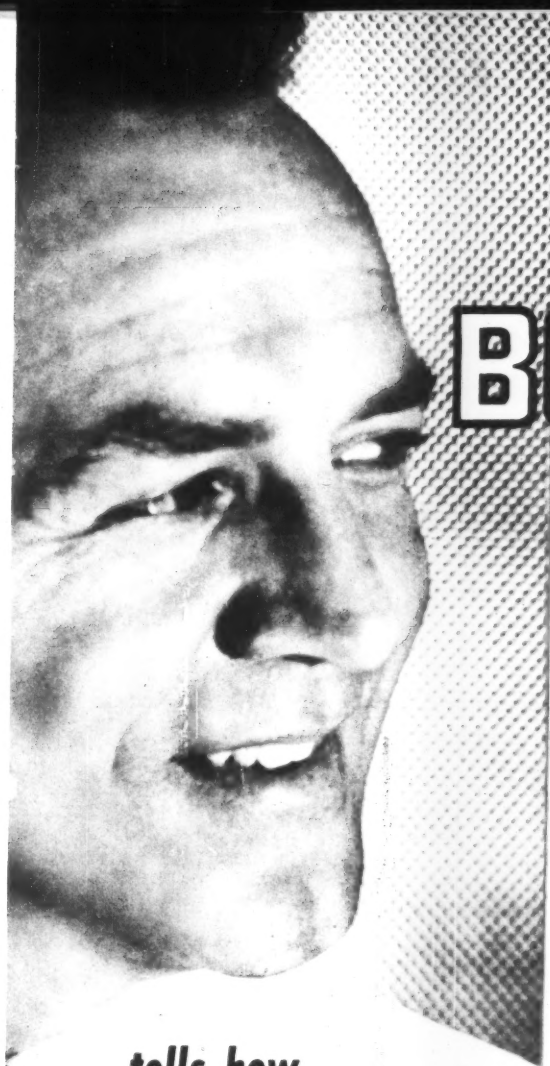

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STATE AND LOCAL TAXES

continued from page 39

even if the rate was lowered further. They showed exactly how much lower the tax burden was on competing insurance companies located in other states. They showed that Connecticut had gained only one additional insurance company since 1940. In the same period, New York had gained eight, California thirteen, and Pennsylvania seven. Other states with lighter insurance taxes showed similar increases.

Both houses of the legislature passed the tax reduction bill, overriding the Governor's veto. Under the new law, the tax will continue to drop by stages until, in 1963, it will be eliminated.

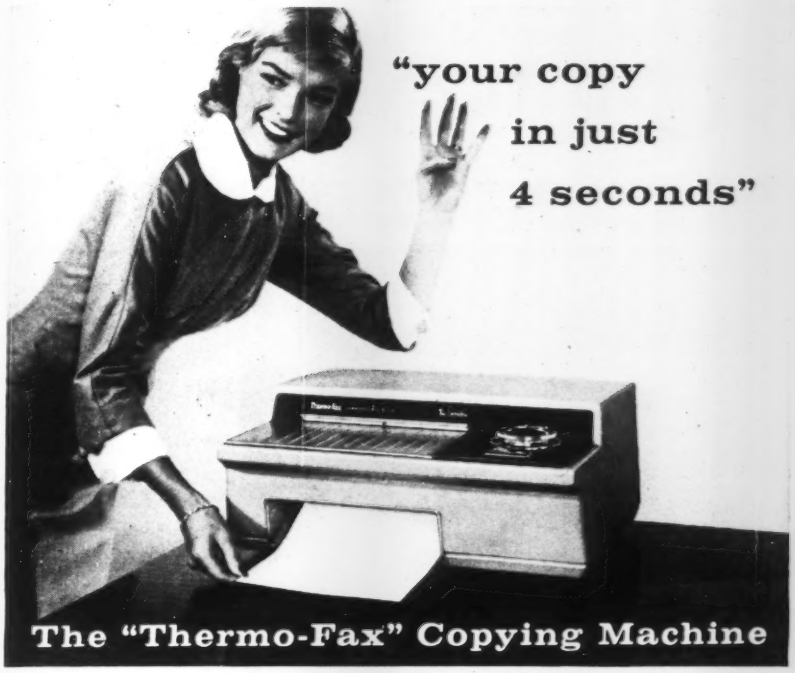
Property Tax Inequities

Apart from excessive tax rates, nothing irks the business community so much as discriminatory property tax assessments. Inflating the assessments on business property is much easier than increasing the tax rate of an entire community. To revenue-starved cities and towns, no increase is too large, and no increase is too small. In one year, the assessed valuation on the Pennsylvania Railroad terminal at Sunnyside, Long Island, was increased from $424,000 to $707,000, though the property had not been improved. A baggage clerk in one remote railroad station cleaned out a neighboring bog on his own time and made it a lily pond. Because of this, the station's assessment went up $100.

The Otis Elevator Corp. fought a running court battle with Yonkers, New York, for 30 years over the assessed valuation of its property. Finally, in 1955, it threatened to leave the city for the Midwest unless its assessment was reduced and other operating economies were achieved.

"Otis is not asking for favoritism," said company secretary Fayette S. Dunn. "It is asking for the same treatment that every resident of Yonkers is entitled to receive, namely, that its property be assessed at and taxed upon its fair value and no more. Otis simply wants plain fair dealing."

As examples of inflated tax assessments, the company said that land bought two years earlier for $60,000 was assessed at $104,900, and land purchased at auction from the city



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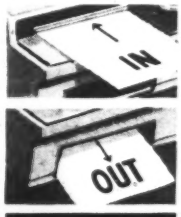

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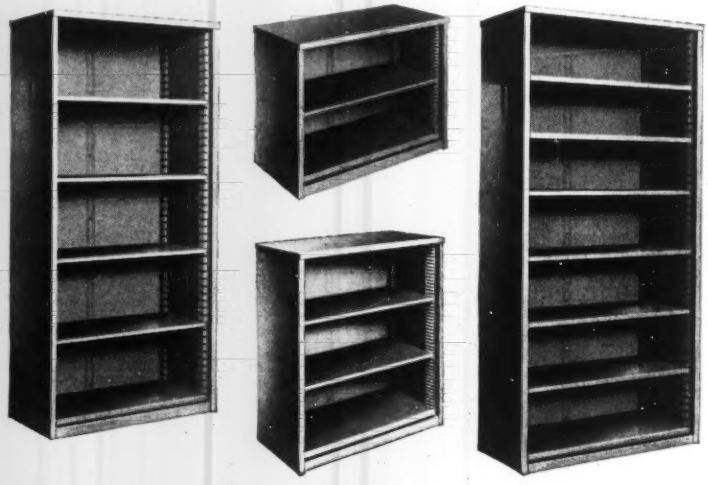

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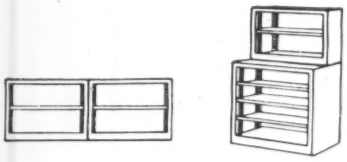

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"The same disposition to disregard the actual market values is reflected in the high assessments of our other larger properties," said Dunn.

Yonkers finally agreed to reduce the assessments, and Otis remained in the city.

Taxes More Than Earnings

Much the same kind of property assessment fight has been going on between the state of New Jersey and the railroads. "Last year New Jersey taxes on railroads were almost double what they earned in the state,"

THE AUTHOR • Melvin J. Goldberg is a business writer who specializes in taxation and public finance. He was formerly associated with Prentice-Hall, Inc., where for four years he edited the weekly business newsletter, *Information*. Besides contributing to professional and business journals, Mr. Goldberg has written on financial subjects for *Coronet* and other consumer magazines.

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says Stanley Commaker, supervisor of property taxes for the Pennsylvania Railroad. "This year, with our earnings down, we will be paying more than $2 in taxes to New Jersey for every dollar we have earned in the state. That is, the state is taking every dollar so earned and another dollar besides."

At the root of the problem, the railroads say, is the practice of assessing railroad property at 100 per cent of true value and neighboring property at a fraction of its value.

Early in 1956 the Lackawanna Railroad filed suit to compel the state to reduce its 1956 assessments from 100 per cent to the same rate at which other property owners are taxed in the locality. Lackawanna specifically asked for reductions to 52.5 per cent of true value in Newark, 62.6 per cent in Jersey City, 70.8 per cent in Hoboken, and 30.5 per cent in Secaucus.

In February, 1957, five other railroads joined Lackawanna in a second suit dealing with their 1957 assessments in the same municipalities and three others. At stake was an annual tax reduction of about $4 million from the $14 million that the state collects on the railroad properties involved.

Throughout the involved legal hassle, the New Jersey railroads kept

the press and the public informed of the issues. New Jersey newspapers sympathetically reported the tax crisis the industry faced under such headlines as: WHO PAYS FOR UNFAIR RAILROAD TAXATION, SHALL WE KISS THE RAILROADS GOOD-BY, CAPITAL PUNISHMENT, DON'T TAX THIS VITAL INDUSTRY TO DEATH.

In a decision on the 1956 Lackawanna case, the State Supreme Court ruled that the State Division of Taxation had the power and duty to assess railroad property at less than true value when necessary to prevent discrimination. The state has not yet reduced the assessments. New railroad suits to compel reduction of the 1957 railroad assessments are now in the courts.

Some Ran Away

Many other companies, less deeply rooted to their sites than the railroads, have chosen to relocate plants in low tax areas rather than try to lower assessments or change the local tax law. The tax manager of one large manufacturer puts it this way: "The legislature passes a law taxing everyone south of 59th Street. And then they act surprised when we move up to 60th Street."

Brown-Forman Distillers Corp. recently canceled plans for a $1.5 million warehouse in Kentucky because of the "tax situation." Instead it will lease storage space in Indiana. George W. Brown, president of the company, estimates that the move will save $100,000 a year in taxes.

Wisconsin taxes, the state taxpayer association says ruefully, "will find the state three miles short of being the site of a new million-dollar automotive parts manufacturing plant." The Warner Electric Brake & Clutch Company decided to expand on a site south of the state, in Illinois.

"The state tax situation makes it much more advantageous to locate in Illinois," says company president Steven P.J. Wood. "Because of this we were forced to bypass Wisconsin."

Nearly all the company's officers and employees, it was reported, live in Wisconsin.

The National Can Company recently curtailed operations at its Baltimore plant because of the city's tax on manufacturers' inventories and equipment. Since the tax was adopted a few years ago, the Baltimore Association of Commerce has been

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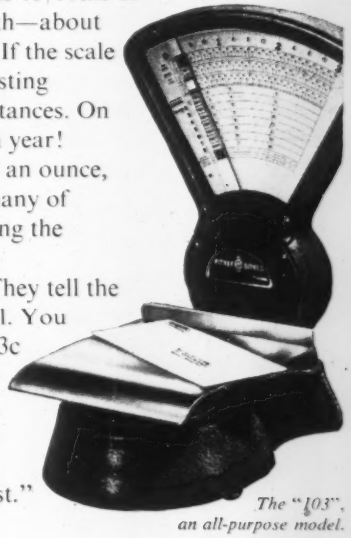

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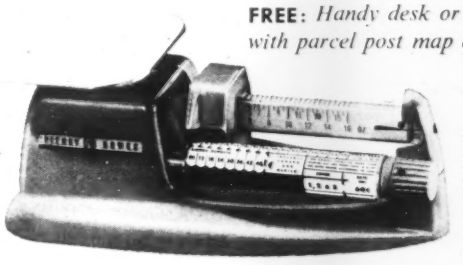

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keeping a running box score of companies who have left because of it. At last count the total was eleven.

Taxes and New Plants

The role of state taxes in plant location flashed into the headlines last year when General Motors president Harlow H. Curtice, responding to an inquiry of the Detroit *Free Press*, said that Michigan taxes had led the company to locate new plants in other states. He said that taxes would be taken into consideration in the placement of additional plants.

"Here in Michigan, as in all states where we operate, we seek no favored treatment," said Curtice. "We are completely willing to bear our share of the cost of government." But he pointed out that in other states taxes per General Motors job are less than half the taxes per job in Michigan. Under a 6 per cent corporate income tax then being considered by the legislature, said Curtice, it would become four times as costly in taxes to do business in Michigan. "Michigan's advantages are not enough to overcome the additional handicap of the proposed taxation."

Other Michigan industrialists polled by the *Free Press* reached the same conclusion about the corporate income tax. "If such a proposal were enacted into law, I would be obliged to advise strongly against further plant expansion by Ford Motor Company in this state," said Alan L. Gornick, the company's tax counsel.

American Motors' president George Romney said that if Michigan's reputation as a high tax state increases, it could seriously affect the state's industrial future.

"If taxes on business in Michigan are increased further," said L.L. Colbert, president of the Chrysler Corp., "it will be increasingly difficult for any manufacturer to let other factors which favor Michigan outweigh the taxes when expansion is considered."

Plant location specialists agree that factors such as the labor supply, markets, raw materials, transportation, and power are considered first when a new plant site is being chosen. When the search is narrowed down to two or three choices, taxes swim into focus.

Hard to Figure

The maze of overlapping state, county, and municipal levies often makes it difficult to compare the relative tax advantages of two different areas. The amount of tax per capita is a rough first approximation, but it doesn't reveal how taxes are apportioned between business and individuals. Low state taxes can be, and often are, offset by relatively high local taxes. And if a state does have relatively low state and local taxes, its long-term debt may portend increases.

For all the difficulties, some companies have given the problem of relative taxes studious attention. An Eastern trucking concern called upon an electronic computer to figure whether the tax savings of moving across a state line would outweigh its added expenses in gas, oil, and rubber. A major electrical manufacturer ran a painstaking study of the local taxes in every one of the areas where it makes and sells its products.

"Taxes *are* important," concludes Mabel Walker, executive director of the Tax Institute, Inc. "A burdensome general level of taxation or punitive and discriminatory taxes will drive business enterprise from a community. Evidence is available of

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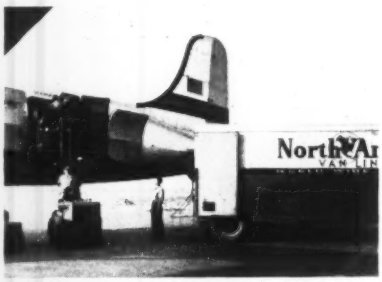

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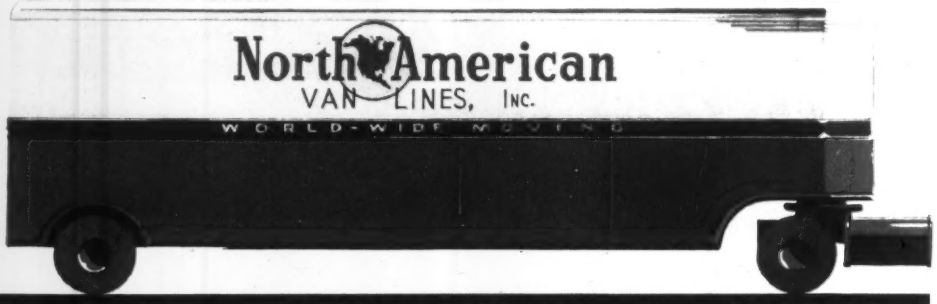

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such an impact. . . . In most instances other factors will greatly outweigh tax considerations, but, in situations where other considerations largely cancel out, a tax differential may very well be the marginal factor which will tip the scales."

Industry Bait

That apparently was the case with the Allied-Kennecott Titanium Corp. Four days after North Carolina cut its tax on corporations, the company wired Governor Luther H. Hodges that because of the reduction, it had decided to locate its new titanium plant in the state. North Carolina reproduced the telegram in newspaper and magazine ads across the country.

Such things are read by legislators as well as business men. Local lawmakers have not been blind to the effect of tax policy on their area's industrial future. In the last few years some two-thirds of the states have set up tax study commissions, frankly aimed at making the tax climate more salubrious for business. The recommendations of two, Florida and North Carolina, have already been made into law.

An extensive tax study was recently concluded in Minnesota. A twenty-man group, representing industry, labor, agriculture, and the economics profession, spent more than a year reevaluating the state's entire tax philosophy. The 800-page report, approved unanimously by the group, recommended total tax cuts of more than $30 million annually, to be made up by improved methods of collection. The entire study was financed by private contributions.

Because the report was completed too late to give the legislature time for intensive study, only a few of the committee's legislative proposals were adopted at the 1957 session of the Minnesota legislature. "There's no question that this subject will have major attention in the 1959 legislative session," says J. Cameron Thomson, chairman of the board of Northwest Bancorporation and chairman of the study commission.

Effective Budget Aid

State and local taxes must, of course, be geared to meet the locality's revenue requirements. General tax cuts can't be made unless the budget is cut, too. Often the spur to reduce expenses must come from business. The pressures within local government to maintain public payrolls are too great. It was just such a spur from the Esso Standard Oil Company that led the city of Bayonne, N.J., to reduce its budget and tax rate substantially, winning for the company the gratitude of city officials and citizens alike.

In 1955 the Tidewater Oil Company abandoned its plant in Bayonne because of high local taxes. Instead of cutting the budget to offset the $10 million loss in tax ratables, the city commissioners increased it. Dr. David Edwards, manager of Esso's Bayonne refinery, was shocked to read in the newspapers that the tax rate was expected to increase from $8 to $12 per $1,000 of assessed valuation, on top of the city's already high rate of nearly $80 per $1,000. The owner of a house in Bayonne worth $15,000 was already paying over $500 in property taxes. Esso was paying $2,786,000, one-quarter of the city's total tax bill.

Ready with the Facts

Carefully avoiding the language of an ultimatum, Dr. Edwards said that the proposed tax increase would

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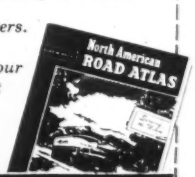

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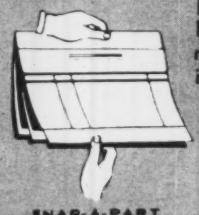

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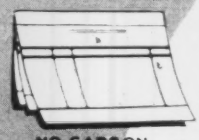

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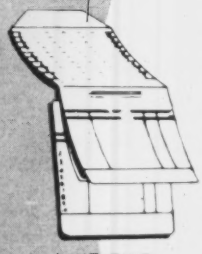

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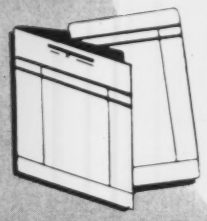
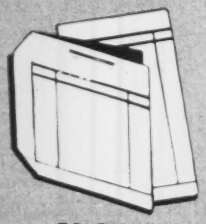


SADDLE BACK (SR-2)



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Tallahassee: Robinson Inc. 3-4755
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Chicago: Modern Bus. Forms ST 2-7089
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Elkhart: Service Press 3-0800
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Indianapolis: C. H. Arend CL 5-0420
Indianapolis: Indiana Bus. Forms WA 5-9857
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So. Bend: Superior Bus. For. CE 3-5350
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MARYLAND
Baltimore: Better Bus. Forms PL 2-2350
Baltimore: D. N. Owen & Co. SA 7-0077
MASSACHUSETTS
Newton: Certified Bus. Forms PE 2-5971
Townsend: New England Bus.Ser. TO 111
MICHIGAN
Detroit: G. Norman Brown TR 5-7978
Detroit: Industrial Printers LI 3-9594
Grand Rapids: Superior Bus. Forms GL 6-1087
Kalamazoo: Superior Bus. Forms FL 3-1649
MINNESOTA
Duluth: Modern Supply Co. RA 7-2441
Minneapolis: Arnell Bus. For. FR 7-1814
Moorhead: Steffens Ofc. Equip. 3-1736
MISSOURI
St. Louis: Brice Co. CH 1 3435
St. Louis: Jerome Inc. JE 5-7677
NEW JERSEY
Laurel Springs: Lou Fink & Son 4-0082
Morristown: Service Bus. Forms JE 9-2959
Trenton: Bill Brown & Co. EX 6-9191
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Albany: Cooley Bus. Forms A-89-3137
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compel the company to stop the modernization program that had been under way at the plant since 1953. Many of the 500 workers engaged in the program would have to be laid off. "We have reviewed the proposed budget for the city of Bayonne for 1957 and are gravely concerned with the implication," he said. "If enacted, the increase to the already heavy tax burden on our operations raises a serious question in our minds regarding the future of our operations here."

Budget-Tightening Ideas

Edwards was ready with the facts to show just how and where Bayonne's swollen budget could be cut. After Tidewater left the city, Esso and other companies had formed the Bayonne Economic Research Council to study the city's financial problems. Among the Council's findings:

Bayonne had on its payroll 13.3 workers for each 1,000 of population, compared to a national average of 9.8 workers in cities of similar size.

Bayonne had 2.5 policemen per thousand residents, compared to a national average of 1.6 in cities of similar size.

The Bayonne school system had an average of one teacher for every eighteen students. If the average was cut to one teacher for every 22 pupils (the ratio recommended by the National Education Association), there would be a surplus of 90 teachers in the Bayonne schools.

Edwards met with members of the clergy, civic groups, and fraternal associations to explain the company's position and ask for their help. "The response," he says, "was terrific. Once people knew that the cuts in spending could be made without harm to the school system or the city administration, everyone wanted to know what he could do."

Stung by the possibility of losing a second major taxpayer, the five city commissioners hastily took a second look at their budget requests. Within a week each had pledged to cut the operating budget of his department by 10 per cent. The Board of Education also agreed to cut 10 per cent off the school bill for the coming year. With these assurances, Esso agreed to remain in Bayonne and continue work on its expansion program.

In almost every recent state and local tax fight, as in Bayonne, public

opinion has supported efforts to cut budgets and taxes when a company mustered the facts to show its request was reasonable and justified.

"On your side is the American sense of fair play," says one company tax manager, still showing the scars of his last bout. "It's not enough to say your taxes are high. Everyone's taxes are high. But if you can prove that other companies and other areas pay so much less, the community will be behind you."

More to Come

The stakes are growing bigger.

"The next year will see the most vigorous search in history for new sources of state and local revenue," predicts G. Gordon Tegnell, research director of the New York State Chamber of Commerce. He points out that for the last decade the growing tax needs of local governments have been accompanied by growing prosperity. Tax collections increased automatically with increases in personal and corporate income, forestalling, to a large extent, the adoption of new taxes and an increase in rates.

At the beginning of this year, sixteen states had already reported that tax collections were down because of the leveling off of business. Yet the nation-wide need for new hospitals, roads, schools, and other local facilities will, if anything, increase.

"Tax laws are written and rewritten in such times of fiscal crisis," says Tegnell. "Much of what winds up being new law depends on what business men do, or don't do, in the next twelve months." END

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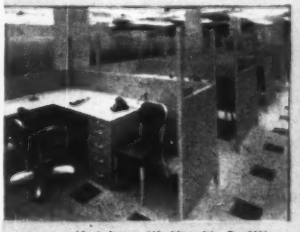

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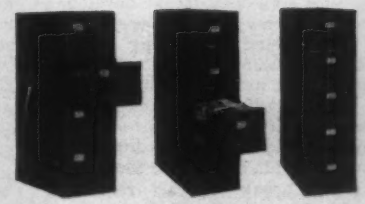

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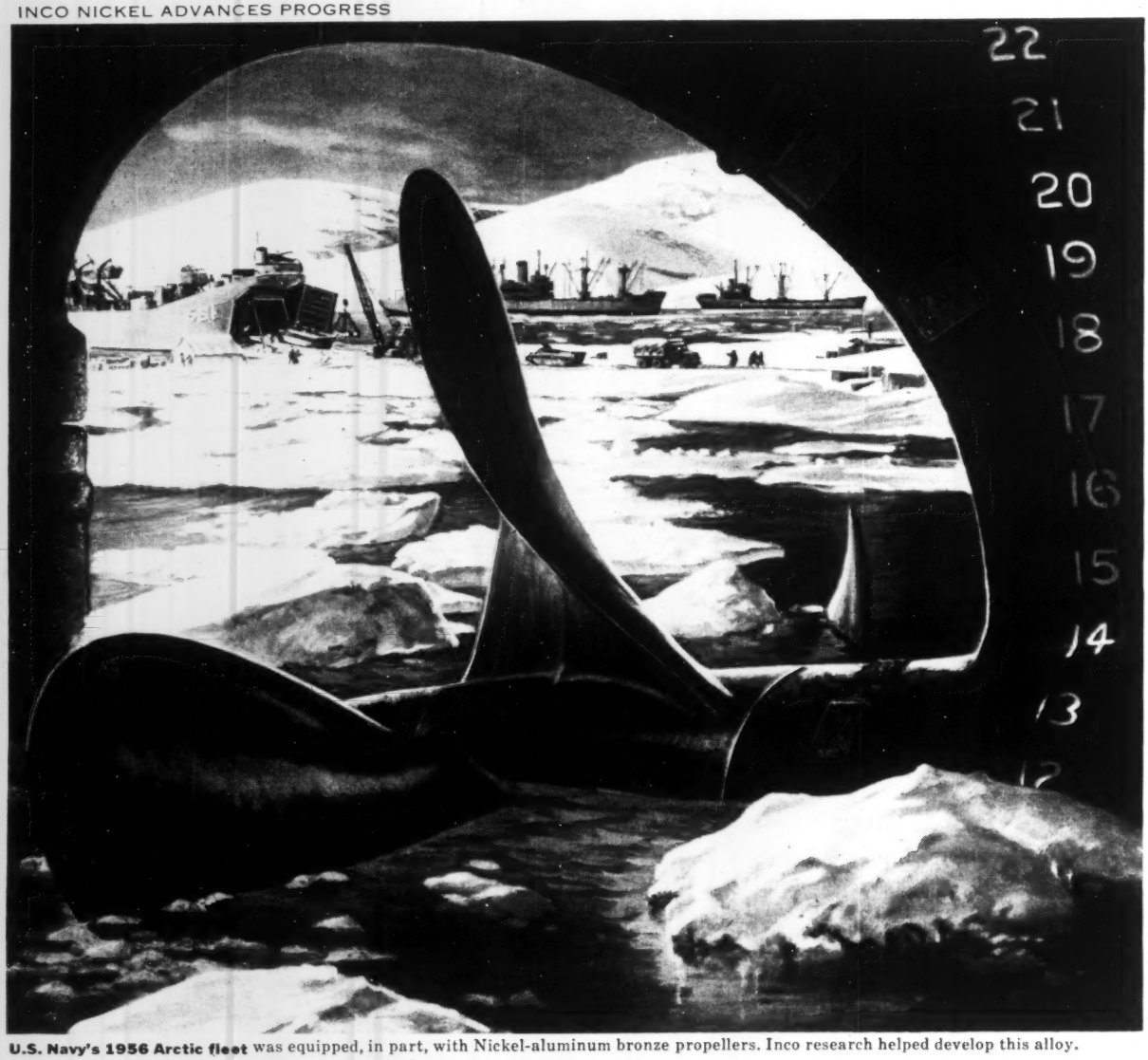

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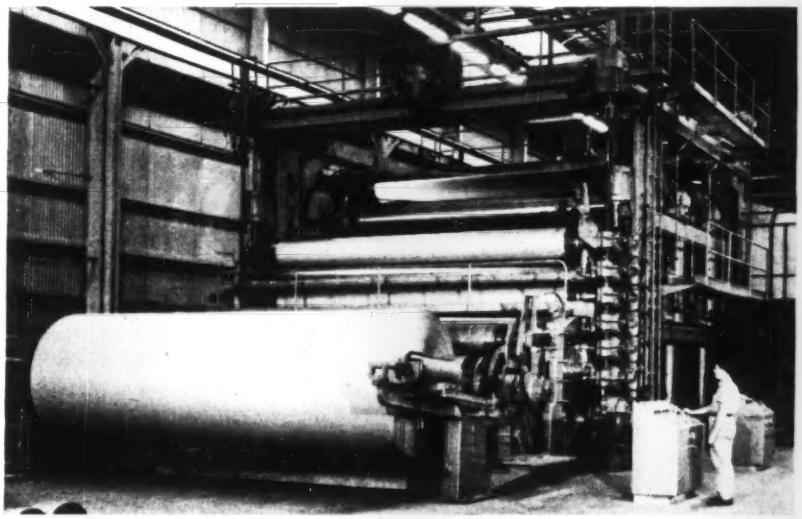

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Whither the transistor?

Just as the ten-year-old transistor has gained general acceptance, one of its discoverers, Dr. William B. Shockley, predicts it may be largely replaced by a new electronic device called the transistor diode. Together with other circuit elements, the transistor diode could take over the role of the transistor in giant digital computers, according to Shockley, who shares the Nobel Prize for this great discovery with Drs. John Bardeen and Walter A. Brattain. Speaking at a recent technical conference, Shockley also predicted the development of transistors that will generate high power oscillations (a function still largely the province of the vacuum tube) and the invention of a machine that will "grow" the necessary thin slices of semiconductor material directly. At present, large ingots of germanium or silicon are cut up into the thin slices used in transistors. This method results in considerable waste.

Shockley is now the director of Beckman Instruments' Shockley Semiconductor Laboratory in Palo Alto, Calif.

Despite Shockley's prediction, the transistor is hardly likely to be entirely replaced in the near future. When the transistor was first brought out, many experts believed that it would soon make the vacuum tube obsolete. Ten years later, more vacuum tubes than ever, a half-billion a year, are being made. Only 28 million transistors were sold last year.

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great improvements that have been made in it over the last ten years. For instance, General Electric has just made an experimental ceramic vacuum tube much smaller than the conventional transistor, although not so small as the miniature ones used in hearing aids. A demand for these tubes will undoubtedly continue for years because they operate at far higher temperatures than ordinary transistors.

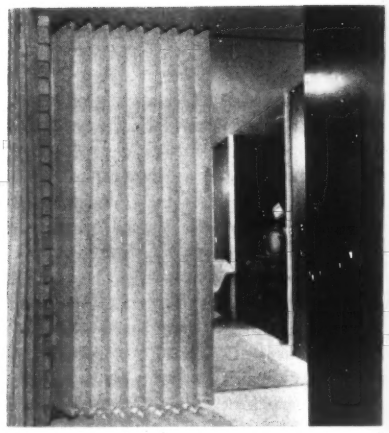
Tough, fire-retardant papers

The American economy seems to depend on paper as much as on steel. Now there are two new papers, both with promising industrial applications. The first is an extra-tough stretchable kraft paper, which is as suitable for industrial packaging as for grocery bags. The other is a fire-retardant stretchable industrial crepe.

In tests on large sacks like those used to package granular products, the new kraft paper withstood twice as many drops as regular kraft. Manufactured by West Virginia Pulp & Paper Company, New York, the paper was invented by 83-year-old Sanford Cluett, who developed the famous "Sanforized" technique for the prevention of shrinkage. Cluett is vice president of Cluett, Peabody & Co., Inc., New York.

The fire-retardant "X-crepe" is made by Cincinnati (Ohio) Industries, Inc. It can be stretched up to 60 per cent longitudinally and up to

NUMBERS IN COLD LIGHT: As computing, counting and measuring machines get faster, the operator has to be able to read or check them faster. One answer is alphabetical-numerical displays, such as this new experimental Westinghouse electro-luminescent design. It is brighter and more compact than present ones. The color can also be varied.



FOLDING DOOR: This wooden vertical-louver door adjusts for light and ventilation control in factories and offices. Made by Consolidated General Products, Houston.

45 per cent laterally. It has a number of applications, particularly in furniture laminations, housewares, and appliance cabinets.

Shaped fused quartz

By developing a technique for forging fused quartz, Engelhard Industries of Hillside, N.J., can produce shapes with minimum waste of the strategic material. Until now, fused quartz was supplied in cylindrical ingots that needed considerable grinding before they could be made into usable lenses, windows, prisms, or missile parts.

Fused quartz is of great value in the optical, electrical, electronic, metallurgical, chemical, and aeronautical industries.

Bendable coating for metals

Usually, decorative and protective coatings are applied to metal after it is formed, but a newly developed coating can be put on sheets of metal before bending or drawing operations are carried out. Based on the work of metal craftsman Oscar Baech, Electro Metallurgical Company, New York, has commercialized the process for initial application to building curtain walls. However, the new, tough coating has possibilities for a variety of products in other industries, including autos and major appliances.

Although it is now available only in black, the coating will soon be made in all the colors of the rainbow. Electromet will license the process. —M.M.

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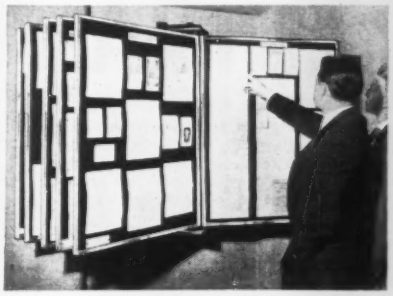

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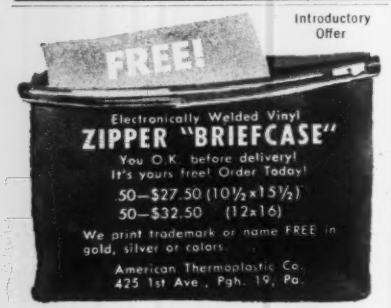

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WORKERS JOIN THE WAR ON COMPETITION

continued from page 48

the day's news and several specific references to the business and the competitive situation.

Some managements prefer employee newsletters to employee publications for talking business facts, because the circulation of newsletters is under tighter control. Employee magazines generally have some external circulation. The fear still lurks in some management minds that, if talk about competition gets out, outsiders will "find out too much about the company."

Additional Devices

Some concerns use even more dramatic devices to get competition on employees' minds. Several companies have moved competitors' products into their own plants, set them up in display space, attached price tags, and invited employees to examine them. At the plant of a Midwest manufacturer of containers, the plant manager announced that the company had won a container contract over a competitor. He displayed the competitor's product beside his own in the employee entrance with a sign on which he credited the employees with securing the contract. The sign read in part: "*You* got this order . . . because of the quality *you* built into this product. . . . We were faced with a lot of competition—look over the hottest contender, the runner-up."

Asked what he would have done if the competitor had landed the order, the plant manager replied: "I would still put the containers side by side, only this time I'd urge the people to examine carefully the product that beat ours to the sale. I'd point out some things for them to look at during the examination."

In an effort to underscore the strength of competition and the need for quality, several companies exhibit customer-rejected products in the plant, at times accompanied by letters from the customers complaining about the shipment. (This is disapproved of by most personnel people, as well as by unions.)

Several companies are using the suggestion system to develop employees' consciousness of competition. Through plant bulletin boards and employee papers, employees are invited to concentrate on cost-saving suggestions linked to lower production costs and a stronger company competitive position. The Gates Rubber Company, Denver, emphasizes competition continually in its communications to employees and embarks upon periodic waste-reduction campaigns. One campaign was developed around a slogan contest, which invited employees to submit ideas for Gates's "war on waste."

It is axiomatic that oral communication is superior to written, and that the most effective communication is a combination of both. This is why several concerns that are trying to reach employees with the story of competition turn first to groups they can reach orally.

Showing Employees Around

Employee plant tours provide an ideal setting for putting across the story of competition. At Crouse-Hinds Company in Syracuse, N.Y., 2,500 men and women employees are currently engaged in a three-hour "teamwork break" on company time for a long, close look at the over-all company operation. Each weekday, ten employees are taken on a comprehensive morning tour of the plant. They are shown representative factory and office procedures, tracing a particular product from start to finish. They learn how the work of others is related to their own. They see what it takes to develop quality products at competitive prices. They examine the finished products. They learn what American and foreign markets these products reach and how and why. Each tour is conducted by retired Crouse-Hinds employees, who have been invited to assist in the program. The company estimates that the program will take a year and cost more than 7,500 man-hours. But one official remarks, "We believe it is one of the best investments we ever made."

In Jenkintown, Pa., at Standard Pressed Steel Company, a program combined oral and written communication to bring about an appreciation of quality and competition. Under the plan, H. Thomas Hallowell, president, visits the shops regularly, checks the salvage cages, asks for and gets explanations on re-runs. He meets regularly with all the bosses—big and small—to discuss company plans and policies with special refer-

ence to quality and competition. Foremen receive weekly "effectiveness reports" as well as rejection and scrap percentage reports, showing where their departments stand in relation to others in the plant.

To help meet competition through waste reduction, Minneapolis-Honeywell Regulator Company, Minneapolis, some years ago introduced an unusual and dramatic campaign. Teaming up with the local union, the company launched the campaign at a public affair in the Minneapolis auditorium. The Secretary of the Air Force at the time was the principal speaker, and a popular vocalist headed the entertainment bill. The company president and the local union president "kicked off" the drive against competition. And the mayor of the city issued a proclamation complimenting the company and union on the joint labor-management effort. So successful was the M-H waste-reduction drive that another campaign was conducted later.

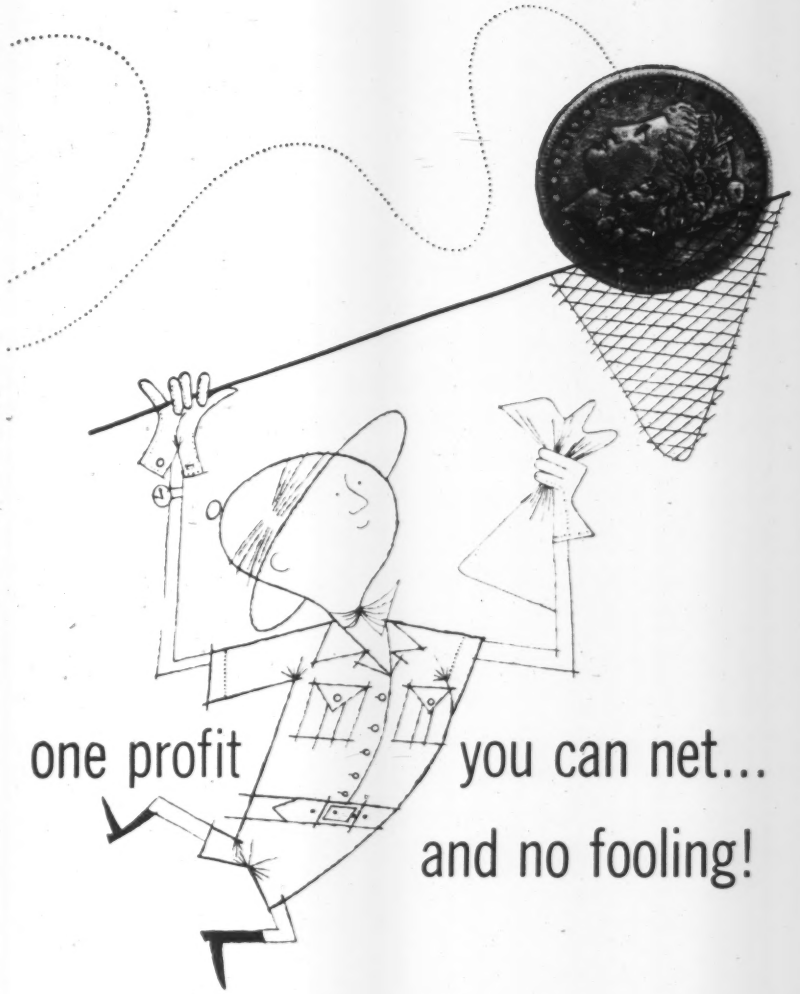
THE AUTHORS • Robert Newcomb and Marg Sammons are the husband and wife partnership of Newcomb & Sammons, Chicago consulting firm. They own and publish *The Score*, a monthly management report on developments and trends in employer-employee communication. Both have pioneered in the industrial editing field.

Measuring Results

Just how effective is this burgeoning management campaign to persuade employees to appreciate the threat of competition, the need for quality, the significant role of the customer? That is, how is it paying off in cash on the barrelhead?

A financial report is hard to come by, largely because companies are reluctant to publicize figures and because results are not always accurately measurable. The most tangible results apparently come from the waste and scrap reduction campaigns which—by lowering production costs—help increase profits.

A waste and scrap reduction campaign of some months' duration was calculated by one company to have saved more than $100,000. The company has about 4,000 employees. Another company with fewer than 1,000 employees conducted a ten-week drive and estimated its savings at $8,000. In both cases estimates rep-



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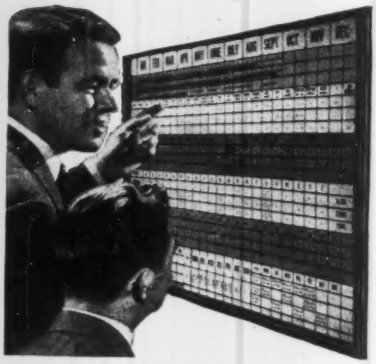

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resent net savings for one year, after costs of the campaigns are deducted. Since several suggestions made during both campaigns will result in recurring savings, the amounts over a period of years will unquestionably be higher. In both concerns the management reported another saving: better employee morale, as reflected in improved productivity.

It is useless simply to hold the threat of competition over employees' heads. Employees don't understand the implications of competition until they are shown, specifically and in detail, how it affects *them*. Occasionally, it appears, a plant must close down before the lesson becomes clear, and then it is too late. In the latter part of 1957, Robbins Engineering Company, a subsidiary of Ex-Cell-O Corp. in Detroit, closed. In a requiem delivered to Ex-Cell-O employees, H. Glenn Bixby, the company's president, uttered some solemn truths:

> Robbins is not closing because we failed to get a single large order any time recently, or because of any slump in the over-all economy. Robbins is closing because too few persons realized two years ago that *tomorrow is today*. The practices of two years ago, and the continuance of those practices, have brought about this saddening closing.
>
> Two years ago and more, Robbins was providing good jobs and a good product at a good price. Just about everyone was satisfied that performance was excellent. Perhaps they felt things were so good that nothing need be done to improve matters. But with Robbins, as with so many other companies in a comparable position, hungry competition was closing in. These hungry persons were holding their costs to a minimum to make possible a lower price for their products . . . High costs simply make us noncompetitive. There is a menacing atmosphere composed of such recklessly wasteful coercions as an electrician and his helper to replace a light bulb; a machine to be moved and the millwright cannot proceed until someone else is called in to pull the plug. We have many other instances in our plants of "featherbedding" and economic waste, such as slowdown practices and limiting output far below a worker's ability to produce; refusal to permit a worker to run two or more machines; refusal to permit an Ex-Cell-O plumber, carpenter, or maintenance man to go to the Robbins plant without a union representative. Thousands of useless hours are spent each month in digging up, airing, and discussing phony grievances.

The presidential shot-calling signaled a series of sobering articles in later issues of the Ex-Cell-O employee paper. In an effort to rally employee support to the common cause, the editors used such devices as a quote from *The Wall Street Journal*, reporting a further decline in orders in the machine-tool business; an interview with a sales vice president on the disturbing general sales situation; an analysis of the company's competition; and a level-headed, documented appeal for help. President Richard J. Gray of the AFL-CIO building trades union was saluted editorially for advocating a wage moratorium. Virtually every issue of the employee paper describes the competitive situation, enlists employee cooperation, and suggests specific ways and means to put that cooperation into force.

The Platform Comes First

To build a program designed to acquaint the employee with the competitive situation, management needs a communications platform first. Then, to talk competition to employees, management must have an accepted voice.

A fine example of what is meant by "an accepted voice" is to be found at the Providence, R.I., factory of United States Rubber Company. There, a five-year experimental communications program has shown some astonishing results, both in employee morale and in specific, measurable savings. In spite of serious setbacks (loss of products because of a price squeeze, a million-dollar hurricane loss, a 50 per cent employment drop, and so on), the communications experiment wound up with these credits: Grievances were cut 36 per cent. Arbitrations were cut 70 per cent. Absenteeism was cut in half. Factory salesroom business nearly doubled. Lost-time accidents were cut 70 per cent. The number of suggestions more than doubled. Dollar savings to the company for employee suggestions more than tripled (one contest on reduction of waste resulted in a saving of $139,000). And factory management testifies to an improvement in employee attitude and acceptance of change.

But the U.S. Rubber program was no sudden, pump-priming activity to get cooperation flowing overnight. On the contrary, it was developed slowly and carefully, over a period of time.

If an employee feels a sense of kinship with management's problems, he will usually respond. If he can understand how competition can affect everyone in the company boat, he will willingly reach for an oar.

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LET'S FIX THE FLAT—AND GET ROLLING

"THE TIRE IS ONLY FLAT on the bottom," the lady said. And that's what some experts say about our drooping economy. However, the puncture is not always near the sag, and we can be deluded in looking for the cause behind the effect. In the case of our dallying industrial machine, we had better examine the top as well as the bottom if we want to patch the leak.

Management faults are often concealed in a supposedly puncture-proof economy. Business has been riding on well-inflated tires, and we have been overimpressed by inflated statistics. When you multiply zero, you still have zero—nothing more or less. When you inflate an error in management, however, you enlarge it, and you have something more to account for than you had in the first place.

Inflationary and deflationary dangers cannot be canceled out like a plus and minus. Inflationary forces never meet deflationary forces head on. They attack at different levels and often with delayed effects. Thus, wages may go up while prices go down, or vice versa, as a result of zigzag influences in the economy.

For instance, it is bad business to tie inventories to sales. They do not move at the same pulse or rhythm. It's like hitching a kangaroo (sales) to an elephant (inventory). Sales volume moves in quick starts and stops and sudden turns, while inventory moves with a slower and sometimes more dangerous momentum.

The same is true of hitching wages to cost of living. Despite a surface relationship, the pulse is different. Wages are influenced by degrees of skill, demand for certain products, and availability of the craftsmen. Cost of living reacts to a broader range of influences and is much slower in the tidal lift of its peaks and troughs. Nor do prices and profits balance each other on the economic seesaw. Their rhythms differ; different influences bear on their movements.

The bottom sag and the slow leak in the tire may not be in the same place, but they are related as effect and cause. And it is management's responsibility to look beyond first appearances and see whether anything is "flat" on top, where policies are established. We may jack up the economy temporarily with tax cuts, public-works ventures, and high-level boondoggling. Sooner or later, though, the inescapable decisions on principles have to be met head-on. These decisions deal with unwinding the unnatural price-wage spiral and finding a better tension of supply and demand. Prosperity is measured not by productive capacity but by consumption—and public confidence, far more than public need, is the necessary incentive to consumption.

Our prosperity is paced to a quick-stepping consumer. For some time now, we have been spending inventory reserves instead of money, but this is a short-term corrective. Sooner or later we must order to requirements—and the sooner the better, because the consumer is still in the mood to buy, and he wants full shelves for selection. We must buy at the manufacturing and distribution levels if we want to sell. If we wait too long and the consumer decides to get along without, we'll be in real trouble.

Let's fix the flat and get the machine rolling again in high gear!

The Editors

Out-of-town telephone calls get there first, get things done ...profitably

No one ever buried an out-of-town telephone call in an "in basket."

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instead of Person-to-Person

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Des Moines to Chicago	$1.40	$1.00	25¢
Washington, D.C., to Boston	$1.55	$1.10	30¢
Miami to St. Louis	$2.40	$1.70	45¢
San Francisco to New York	$3.50	$2.50	65¢

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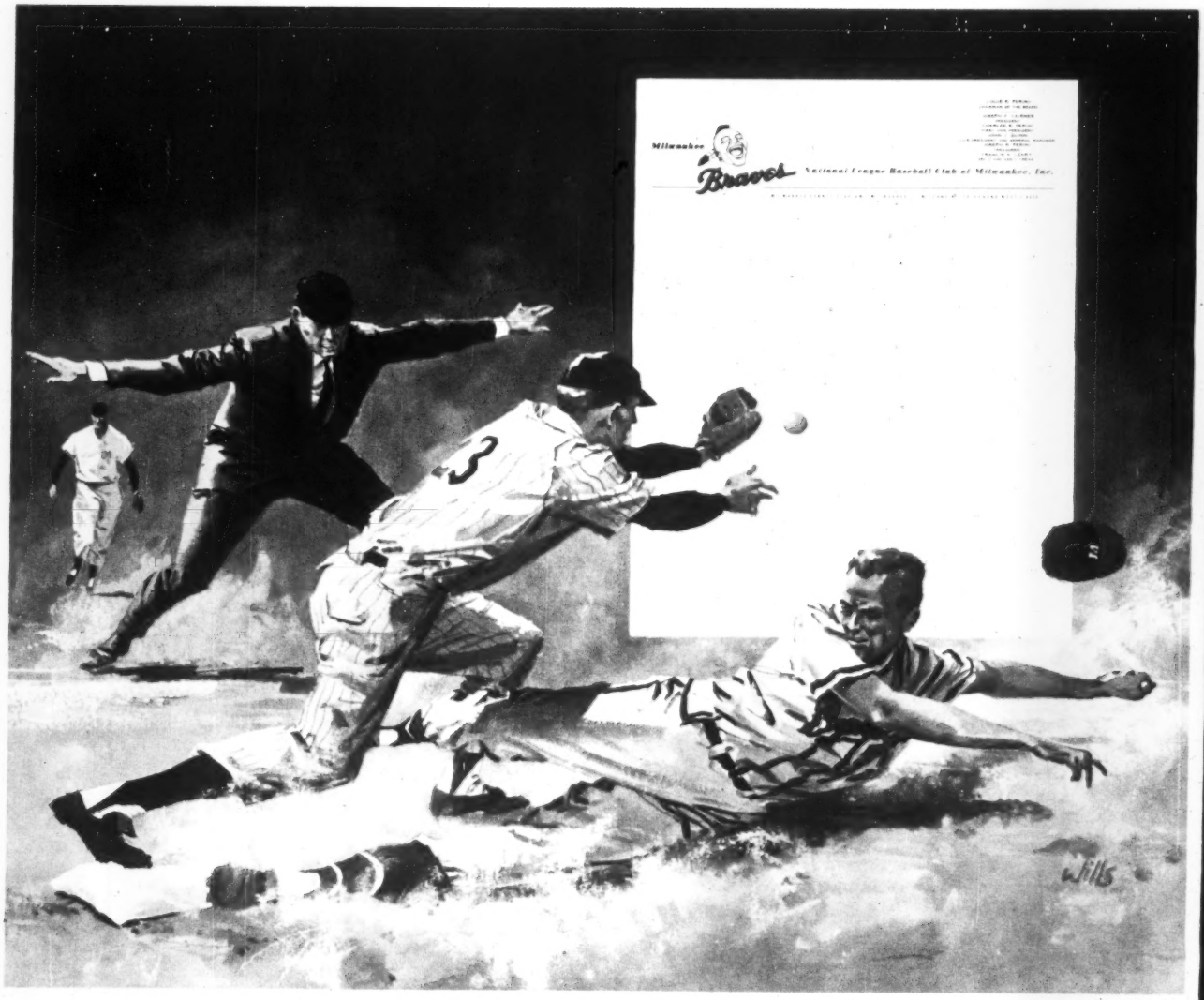

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